Subterranea

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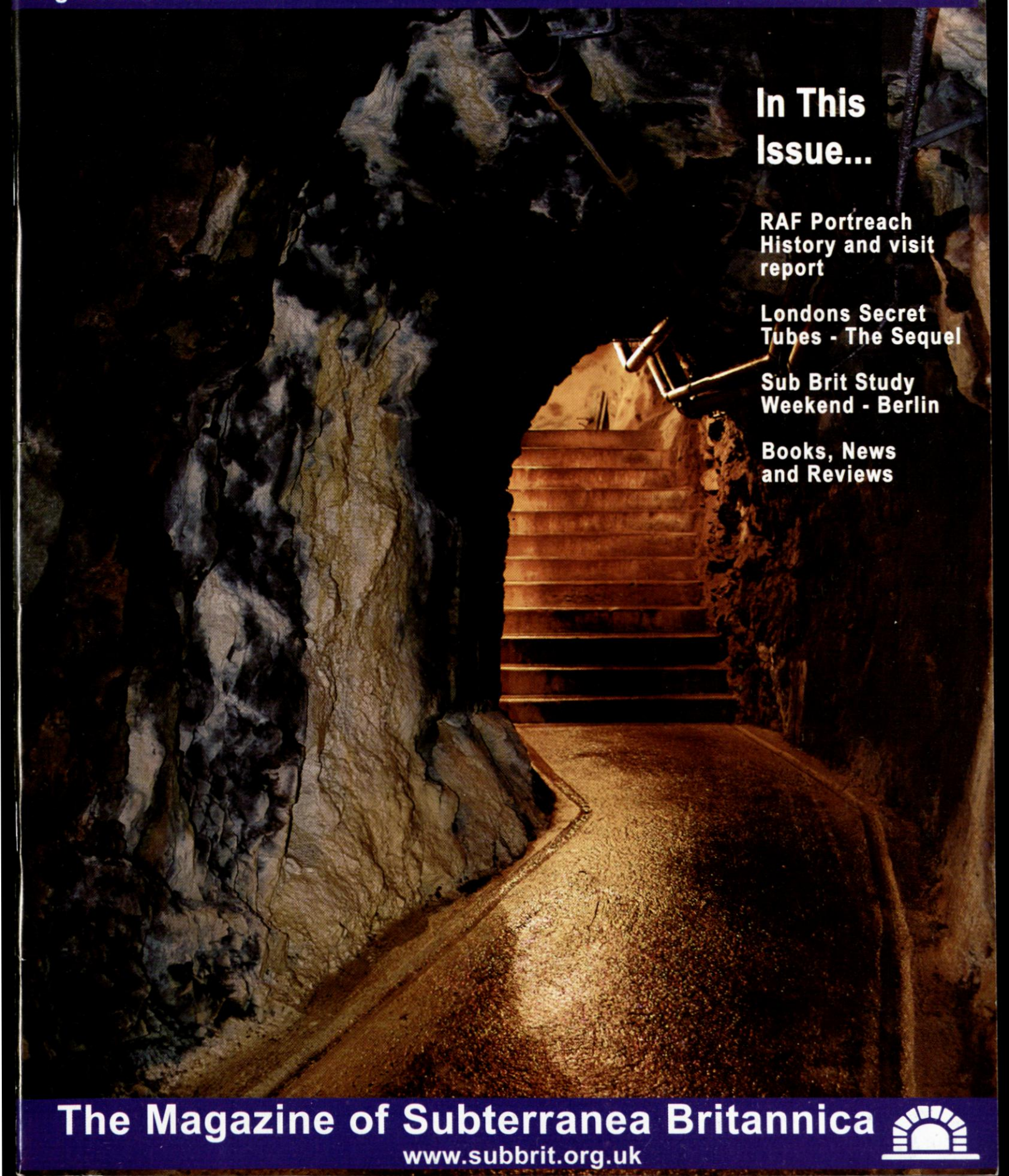

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RAF Portreach History and visit report

Londons Secret Tubes - The Sequel

Sub Brit Study Weekend - Berlin

Books, News and Reviews

The Magazine of Subterranea Britannica

www.subbrit.org.uk

Subterranea Britannica is a society devoted to the study of man-made and man-used, underground structures and the archaeology of the Cold War. The main focus of interest is on abandoned and forgotten structures and, in the case of Cold War structures, studies are entirely confined to declassified and decommissioned structures.
The society is open to all and its membership includes all walks of life. Members are invited to contribute to this newsletter even if this just means sending very welcome snippets from newspapers and magazines.

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Newsletters of Subterranea Britannica are published by the committee of Subterranea Britannica. Original articles , book reviews, press cuttings, extracts from books and journals, letters to the editor etc. are welcome. However the editor reserves the right not to publish material without giving a reason. The committee of Subterranea Britannica and the editor do not necessarily agree with any views expressed and cannot check the accuracy of any material sent in.

Front Cover - The entrance to the Swiss Artillery fort of Beatenbucht protecting the access roads to Thunersee near Interlarken. Rear Cover Top - One of the guns at Beatenbucht ready to fire on the access road around the lake. Bottom - An ammunition store in the Large Swiss artillery fort of Waldbrand. Photos By Dan McKenzie 2007

News

NEWS - ARCHAEOLOGY

UNDERGROUND RAGSTONE QUARRIES IN KENT

The building-stone Kentish Rag is, in its main area of extraction around Maidstone, a sandy limestone or westwards from that district a calcareous sandstone from the Lower Greensand beds, and was mostly worked opencast. Transport to London by water via the Medway and the Thames made it an important south-eastern building-stone from Roman times onward.

To a far smaller extent, the stone was also quarried underground, at locations such as Mote Park, Senacre Wood and Willington Street to the south east of the county town. And a number of further underground quarries much further west at Hosey Common, near Westerham and the Surrey border, also exploit stone from the Hythe Beds, although here the stone is more or less pure sandstone, lacking any calcareous content.

Rod Le Gear has recently had published a most useful overview of the several known underground workings, some of which are not currently accessible. The best-known, and most accessible outside the bat hibernation season, are the Hosey Common quarries, where six separate systems are now known, and have been well explored, surveyed, photographically recorded, and examined archaeologically. Virtually no documentary records concerning them have been located to date, and published information is limited to accounts by 20th century visitors. They are thought to be of late 18th or early 19th century date, and to have yielded rubbly building-stone for local building. Whether or not some of the ragstone in the much older village church is from Hosey Common or from some other local source is not clear.

Rod's paper includes a plan shewing all six Hosey Common systems, an underground view in one of these, a plan and interior photograph from one of the Mote Park quarries, and sketch plans of the Senacre Wood and Willington Street 'Caves.'

SOURCE: Rodney F. Le GEAR, 2007, Underground ragstone quarries in Kent: a brief overview. Archaeologia Cantiana 127, 407 - 419.

RE-DISCOVERY OF A LOST GALLERY AT CHISLEHURST 'CAVES' (CHALK MINES) IN THE LONDON BOROUGH OF BROMLEY

Parts of the extensive series of three interlinked chalk mines, generally known as the 'Caves,' at Chislehurst having long ago collapsed, developers of land above the affected area have naturally been aware of the need for ground investigation before planning new buildings. Boreholes sunk for this purpose in 2006 revealed hitherto unrecorded voids in the area of the 'Inner Series' mine.

Rod Le Gear has interpreted video footage of such a cavity 16m below ground level recorded by a down-hole camera. This revealed a mined gallery with a deteriorating mine ceiling and a debris-covered floor. Both ends of this gallery had been sealed by roof-falls, and debris on the floor appeared to include Thanet Sand as well as chalk, indicating partial failure of the roof-stone (a 10 - 15 cm thick hard chalk bed) and superincumbent chalk allowing the sand layer above to fall in in places. There were also signs of flooding, which has affected the 'Caves' from time to time, notably in the 1860s and 1968, the floor of the mines being little above the local water table and the level of the diminutive River Quaggy in the valley bottom nearby.

Documentation of the Inner Series

SUBTERRANEA BRITANNICA DIARY of Forthcoming Events

Sub Brit specific events

7 - 9 September 2007
Study Weekend, Cumbria.

6 October 2007
Autumn Day Conference,
Leicester University

December 2007
"Subterranea" 15
published
* Copy deadline
15 November *

15 March 2008
Hack Green

April 2008
"Subterranea" 16
published
* Copy deadline 15 March *

12 April 2008
* date to be confirmed *
AGM and Spring Day
Conference

General events

15-16 September 2007
* provisional date *
Wealden Cave and Mining
Society
40th Anniversary

21-24 March 2008
* to be confirmed *
AIA, Ironbridge Weekend

4 - 6 July 2008
NAMHO conference
EDINBURGH

21-23 September 2007
Hidden Earth

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dates from as early as 1706, and the gallery recently detected is thought to have been mined in the period 1707 - 1710.

SOURCE: Rodney F. Le GEAR, 2007, An early gallery at Chislehurst Caves. Archaeologia Cantiana 127, page 435.

SOURCE: Eric R. INMAN, 1996, Chislehurst caves: a short history. Kent Mushrooms Ltd: 13pp.

TUNNELS IN WEST LOTHIAN

Ivan Young has reported on recent investigations in three sets of tunnels in West Lothian. The first is the Ratho Park Golf Course Cundy, a cundy being (it is explained) a Dundee word for a roadside drain. This is followed by an account of the Park Farm drainage tunnel near Linlithgow, and a thrashing mill chamber and tunnels at Ratho Mains. The report includes location maps, plans and sections of voids, photographs, and historical information.

SOURCE: Ivan YOUNG, 2007, Three tunnels under West Lothian. Bull. Grampian Speleological Group 4th Series 3(2), 26 - 37.

EARLIEST JEWELLERY REPORTED FROM A CAVE AT TAFORALT, MOROCCO

Twelve pea-sized perforated shell beads daring from 82,000 years ago have been found in a cave at Taforalt in eastern Morocco, and interpreted as part of a prehistoric necklace which would make them the earliest recorded jewellery.
SOURCE: ANON, 2007, Archaeologists on to a good bling. London Metro, 5 June 2007, page 15.

TWELFTH-CENTURY BUDDHIST CAVE PAINTINGS DISCOVERED IN MUSTANG, NEPAL

Fifty-five 12th-century cave paintings depicting the life of the Buddha (Siddhartha Gautama, c. 563 - 483) have been discovered in a partially collapsed cave at an altitude of 3,400 metres in the Mustang area of Nepal, an area open to foreigners only from 1992, and once a part of Tibet. The site is about 150 miles north-west of Kathmandu. Ancient Tibetan manuscripts have also been found in caves in this region.

A team of restorers working on wall paintings at a 15th-century monastery had asked if there were any other such paintings in the area, prompting a shepherd to recall that as a boy he had seen paintings in a cave, which he was able to rediscover. This has provisionally been named the Snow Leopard's Cave, as that animal's footprints were found in the snow at the entrance, the exact location of which remains confidential.

SOURCE: Maseeh RAHMAN, 2007, Nepalese shepherd leads archaeologists to art treasures. The Guardian, 5 May 2007, page 26.

NEWS - CONSERVATION AND HERITAGE

ENGLISH HERITAGE TO RATIONALISE ARCHAEOLOGICAL AND HISTORICAL SITE GRADINGS

At present the grading of sites and structures of archaeological and historical importance in England is a confusing mass of overlapping categories embracing Scheduled Ancient Monuments, Buildings Listed as of Architectural or Historical Interest, and historic battlefields, gardens, and parks. A Government White Paper containing proposals for a single grading scheme was published in March 2007.

Scheduled Ancient Monuments can include all kinds of underground sites, from natural caves containing archaeological deposits to concrete bunkers. Listed Buildings, on the other hand, have to be 'built' in some meaningful sense. Some more or less subterranean structures, if 'built', can be listed - quite a few tunnel portals and even masonry-lined tunnels for example. But an entirely rock-cut excavations could not be listed. How much of an underground site has to be 'built' to be listable is open to debate. Could the subterranean Godstone Quarries (in east Surrey) be listed, on the strength of their built stone support pillars and dry stone walls?
Confusingly, too, many structures are both Listed and Scheduled, including numerous medieval bridges. In fact a bridge connecting two different parishes either side of a river can enjoy double Listing and Double Scheduling, once each in each parish!

A more rational and unified system seems long overdue!

THE SEVEN SISTERS LIMESTONE MINE AT DUDLEY, WEST MIDLANDS

There are exciting proposals for opening up the still accessible parts of the Seven Sisters limestone mine at the Wren's Nest National Nature Reserve at Dudley, in the West Midlands. The site has been fenced off since the 1960s. A bid for major National Lottery funding has been made, and shortlisted.

The daylit uppermost caverns would be stabilised and made accessible to the public, with the usual complement of interpretation centre, café, shop,

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toilets, and so forth. This would add to the already established and impressive Black Country Museum and Dudley Canal tunnel underground boat trips which visit one of the entirely underground limestone mines nearby.

The project is of particular interest to Subterranea Britannica Chair, Paul Sowan, who fist visited the Seven Sisters mine as an undergraduate in the late 1950s / early 1960s, before so much of the lower part of the mine was backfilled with sand. And it was here, too, that he was, in around 1962 or 1963, introduced to the exploration of man-made underground spaces. And Subterranea Britannica has at least twice included the limestone mines and canal tunnel in Study Weekend programmes.

SOURCE: Graham WORTON, 2007, Seven Sisters limestone mine, Dudley. Geology Today 23(1), 13 - 14.

DIESEL ENGINE LIFTED FROM WORLD WAR II ROYAL ORDNANCE MUNITIONS FACTORY BUNKER AT ROTHERWAS

A photo-feature in Industrial Heritage recorded the lifting of a diesel engine from a 'windowless bunker' at Rotherwas, where it had been installed in 1938/39 to provide power for a Royal Ordnance munitions factory. The engine has been installed at the Water World Museum on the other side of Hereford.

SOURCE: ANON, 2007, Lifting the Blackstone EPV5 5-cylinder diesel engine. Ex Water Words News. Industrial Heritage 32(3), 55 - 56.

NEWS - DEFENCE AND MILITARY

THE NEEDLES BATTERIES, ISLE OF WIGHT

An historical and archaeological report on the Needles Batteries at the west end of the Isle of Wight, by Jonathan Coad, has recently been published. The original Needles Point Battery was built in 1861 - 63 by George Smith of Pimlico, do the design of Major James Edwards of the Royal Engineers. By the 1890s it was found that the percussion of the guns when fired was fracturing the chalk of the cliff top where the battery was situated some 250 feet above sea level. This battery was thus declared obsolete and its guns were tipped over the cliff edge into the sea. It was replaced by the New Needles Battery built in 1893 - 95 on the site of the original Needles lighthouse (out of use by 1859) In 1890 a shaft was sunk and tunnels made at the northern base of the cliffs to house searchlights and guns. Electricity for the lights was generated by a dynamo driven by a steam engine (which survives) in another tunnel. The tunnels were found to be unsatisfactory places for the guns, as their field of fire was restricted (nothing is said in the report about the fracturing of chalk in the tunnels at this new location.) A further tunnel was driven in the late 1890s to connect to a remote 'fighting light' on the western extremity of the promontory. An accompanying plan and section of the original battery locates the tunnel thence to the 1899 searchlight. And an underground engine room and nearby a shell store and a cartridge store 'under.'

SOURCE: Jonathan COAD, The Needles Batteries, IN: GARDINER, Mark, and David TOMALIN (edrs), 2007, The Isle of Wight. Reports and Proceedings of the 152nd Summer Meeting of the Royal Archaeological Institute in 2006. Archaeological Journal 163 (for 2006) Supplement: 81 pp [ISBN 0-903986-51-5], pages 51 - 54.

ACCIDENTAL FIRE, EXPLOSION, NUCLEAR CONTAMINATION AT RAF GREENHAM COMMON (BERKSHIRE) NUCLEAR MISSSILE SILOS AN 'ACCEPTABLE RISK'

Scientific researchers at the Atomic Weapons Research Establishment at Aldermaston, in the 1980s, warned of a 'credible' risk of a nuclear warhead in storage catching fire or exploding, engulfing others in flames and sending a plume of plutonium-contaminated smoke into the atmosphere, endangering tem million persons in south-east England. Reports on the investigation of this risk, pronounced by the Ministry of Defence to be 'acceptable,' have been obtained under the Freedom of Information Act. It was stated that a fire (caused by ignition of rocket fuel) in a single silo could release plutonium from eight warheads, and that Greenham Common was 'the worst of 11 sites under consideration to house the missiles' on account of its being so near urban centres. Information from the USA confirmed that warheads could explode accidentally, although by this time they were being stored at Greenham Common and at Molesworth (Cambridgeshire.)

The MoD has refused to confirm or deny the presence of any nuclear weapons at any particular time or place, and stressed that 'there has never been an accident involving nuclear weapons in the UK that has put the public at risk.'

Between 1983 and 1991 the USA stored 96 nuclear-tipped cruise missiles at the former airfield, which was returned to civilian use in 1993.

SOURCE: Ian SAMPLE, 2007, Greenham nuclear risk for millions uncovered. MoD papers reveal 1980s

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threat to 10m in south-east. Reports obtained under anti-secrecy legislation. The Guardian, 12 July 2007, page 10.

BRITISH WORLD WAR II WATER SUPPLY MAPS FOR MILITARY PURPOSES IN NORTHERN FRANCE

The planning of successful military operations in a land war depends on a detailed knowledge and understanding of geology and soils. An army, whether advancing or static, needs to know how the ground will bear the weight of vehicles; whether trenches will flood or dugouts collapse; and how easy of difficult tunnelling might be, and if pumping will be required. And of course any large body of men and machinery will require water supplies of known quality, and an understanding of any treatment the water may require.

Both the British and the German sides in World Wars I and II devoted much attention to the geology of Belgium and northern France, collecting together and interpreting all accessible geological maps, site investigations, well records, and so forth. The British maps were much in advance of the ten sheets of 1:50,000 German water supply maps prepared for Operation Sealion, the planned invasion of southern England in September 1940.

SOURCE: N.S. ROBINS, E.P.F. ROSE, and J.C. CLATWORTHY, 2007, Water supply maps for northern France created by British military geologists during World War II: precursors of modern groundwater development potential maps. Q. Journal Engineering Geology and Hydrogeology 40(1), 47 - 65.

THE BUILDINGS OF THE GOVERNMENT CODE AND CYPHER SCHOOL, BLETCHLEY PARK, BUCKINGHAMSHIRE

The Government Code and Cypher School at Bletchley was 'underground' only in the sense that it was a secret establishment during World War II, well screened from public view. Members interested in such things may like to know of a recently published academic paper describing the buildings and site.

SOURCE: Linda MONCKTON, 2006, Bletchley Park, Buckinghamshire: the architecture of the Government Code and Cypher School. Post-Medieval Archaeology 40(2), 291 - 300.

PLANNING PERMISSION SOUGHT FOR A NEW NUCLEAR SHELTER AT MIRFIELD, WEST YORKSHIRE

Tim Wood, the landlord of the Old Colonial pub at Mirfield, is applying to Kirklees Council for planning permission for a new nuclear shelter below his car park. He cites recent remarks by Vladimir Putin, and continuing uncertainty about Iran's intentions, as justification. Andrew Smith, of Subterranea Britannica, is reported as commenting on Britain's Cold War bunkers that 'The bunkers have lain disused for 20 years or more. Some don't have power. Some are flooded. The doors don't shut. You could dig yourself into one of those, but you're going to be in there with no food, no water, no heat, no lighting, no nothing.'

SOURCE: Esther ADDLEY, 2007, Return to bunker mentality as pub landlord prepares for last orders. The Guardian, 9 June 2007, page 13.

NAZI GERMANY MILITARY ACADEMY REDISCOVERED IN BERLIN, GERMANY

After the end of World War II some 80% of the buildings of central Berlin were reduced to rubble. This was, largely, disposed of by creating a number of enormous tips (the Germans called them Trummelberge (rubble mountains)) in several of the city's large parks. A number of these tips were used to bury, or in at least one case partially bury, massive concrete wartime structures which would otherwise have been extremely expensive and technically difficult to demolish (only, of course, to create yet more demolition rubble.) A number of Subterranea Britannica members are now familiar with the two surviving (of four) corner Flak Towers of a huge concrete anti-aircraft structure in the Volkspark Humboldthain to the north of the city centre. This massive square structure with four corner flak towers was only partially demolished after the war, as demolition of the two towers overlooking the Deutsches Bahn and Stadtbhan lines at Gesundbrunnen would have risked damaging or blocking the railway. Members of Berliner Unterwelten e.V. have effected re-entry to this structure, and removed vast quantities of demolition rubble from parts of the interior which is now open to the public under the leadership of BU guides.

Quite apart from running guided public tours of the Humboldthain flak tower interior and nearby World War II and Cold War bunkers at Gesundbrunnen and Pankstrasse U-bahn stations, Berliner Unterwelten members explore other aspects of underground Berlin. The Guardian and The Daily Telegraph both, on 19th June 2007, reported the re-discovery of a further World War II structure buried under another 116m high demolition-rubble mountain (known locally as Teufelsberg (Devil's Mountain)), in the west of the city. This has, in modern times, been used by Berliners to enjoy themselves skiing and tobogganing in winter, and flying kites in summer. Potsdamerplatz having

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been identified as nearby, it seems likely that Teufelsberg is in the eastern part of Berlin's Tiergarten.

The unfinished structure, for which Adolf Hitler [1889 - 1945] laid the foundation stone (or perhaps it was a block of concrete?) in 1937, was designed by Albert Speer, Hitler's architect, to be a feature, after the end of the war, as an element in Germania, the intended capital of the Reich that would last a thousand years: use as a military and technical academy for the design a production of future 'wonder-weapons' has been suggested. It has been said that it would have contained accommodation for 5,000 persons. However, the need to devote funds to more immediately pressing military needs led to cessation of work on the allegedly 80% completed structure in 1940.

Dietmar Arnold, a spokesman for Berliner Unterwelten, has claimed this as an addition to the 50 or so bunkers re-discovered by the organisation since it was established in 1997. He suggests that much of the unfinished complex, including a 'massive multi-storey bunker', remains intact below the rubble. BU plans to use a mechanical excavator to dig 20 metres into the north-eastern face of the Teufelsberg, after which it is hoped that members equipped with caving equipment will be able to gain access to and explore underground voids. What is known of the complex has been gleaned from state security records from the 1970s.

Berliner Unterwelten also reports a Cold War tunnel at Teufelsberg, leading from a West Berlin listening-post built on the rubble mountain, which emerges in trees 300 metres away - possibly intended as an escape tunnel, in the event of a Russian attack. Berliner Unterwelten e.V. 'has become a well-respected , well-staffed authority on Berlin's vast trove of subterranean secrets', the Daily Telegraph reports. 'It has succeeded, often by torchlight and on hands and knees, in unveiling huge tunnel networks and air-raid shelters which have been bricked up, buried or bombed.

SOURCE: Kate CONNOLLY, 2007, Hitler bunkers revealed - real and virtual. Speer's military academy buried under hill of rubble. Underground complex reborn as visual tour. The Guardian, 19 June 2007, page 18.

SOURCE: Harry de QUETTEVILLE, 2007, Nazi academy found buried under mountain of rubble. The Daily Telegraph, 19 June 2007, page 9.

CONTACT: Berliner Unterwelten e.V. may be contacted at www.berliner-unterwelten.de / Email info@berliner-unterwelten.de)

NEWS - HEALTH AND SAFETY

DIVING FATALITY AT DOROTHEA SLATE QUARRY, NORTH WALES

The Dorothea slate quarry, between Nantlle and Talysarn in North Wales, has been abandoned since the early 1970s, and is now flooded to depths of up to 100 metres, making it an attractive location for sporting divers. Although predominantly an opencast it includes two tunnels of 21 metres and 56 metres, constituting an additional sporting attraction. Other under-water features include block-houses, a crane, and ledges and pinnacles. Regrettably, the site has claimed 22 divers' lives since 1994, most recently that of a 44 year old woman from Manchester, who became entangled by rope on 11th March 2007.

SOURCE: Thair Shaikh, 2007, Woman is 22nd diver since 1994 to die in north Wales quarry. The Guardian, 12 March 2007, page 5.

METHANE EXPLOSION AT POLISH COLLIERY

The Halemba coal mine, operated by the Zbigniew Madej company near Ruda Slaska, southern Poland, suffered an underground explosion killed at least eight miners, and left the date of 15 unknown. Men had been 'demolishing an underground corridor.' Rescue workers were reportedly digging through 500 metres of rubble in the hope of finding survivors, hindered by damaged ventilation systems. Poland's coal-mining industry has a poor safety record. Earlier in 2006 a miner was rescued after five days in Halemba mine, where he had been trapped as a result of an earlier explosion. More than 80 miners have died in Poland's coal and copper mines since 2003.

SOURCE: Fred ATTEWILL, 2006, 15 trapped in Polish mine after explosion. The Guardian, 22 November 2006, page 19.

METHANE EXPLOSION AT SIBERIAN COLLIERY

At least 71 miners have been killed at the Ulyanovskaya coal mine near Novokuznetski in Kemerovo region, Siberia, in Russia. At least 200 persons were reported to have been working underground, some of them known to be still alive, others unaccounted for. Seventy-five miners had been brought to the surface. The mine, operated by the firm Yuzkkuzbassugol, exploits one of the world's largest coal reserves, produces three million tonnes of coal annually, and commenced work on 7 October 2002. One hundred and eleven lives have been lost in mines in Kemerovo in the last five years, not counting this latest explosion.

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SOURCE: Tom PARFITT, 2007, Siberian gas explosion kills at least 71 miners. The Guardian, 20 March 2007, page 21.

NEWS - MINES AND QUARRIES

CHALK MINES AT COLEY AND CASTLE HILL, READING

Demands that a wider area in the Coley, Field Road and Castle Hill area in the western part of Reading should be investigated for possible continuations of the known (and now filled) Field Road mines have been turned down as too expensive, and insufficiently cost-effective as it is doubted if such continuations actually exist. Investigations commenced here after the partial collapse of two houses into a crater which opened up in Field Road in 2000. Reading was given £ 4.2m to stabilise the crumbling chalk mine galleries discovered to be the cause of the problem, and a further £ 2.6m for ground investigations below a further 243 properties in an attempt to map the full extent of the mines. To some extent, presumably, the decision to limit the investigated area was informed as much by an appreciation of the known extent in from their entrances of chalk mines in general as by the lack of further public funds.

SOURCE: Linda Fort, 2007, Funding: application to extend area under investigation turned down. No more cash to widen mine workings probe. Reading Evening Post, 15 March 2007.

CHALK MINES AT EMMER GREEN READING

Chalk mines below Kiln Road, Peppard Road, Yarnton Close and, possibly, Scott Close are not included within the scope of ground investigations in other parts of Reading. The mines are well-known, and have in fact been visited on several occasions recently by Subterranea Britannica members and been featured on regional television, a Reading Borough Council spokesman has confirmed that 'The Council has absolutely no evidence of problems in the Thames and Peppard wards.

SOURCE: Anon, 2007, No new probe into mines north of river. Reading Evening Post, 28 March 2007.

CAMDEN PARK CHALK MINES, CHISLEHURST, LONDON BOROUGH OF BROMLEY

The Chislehurst 'Caves' (an amalgamation of three chalk mines), operated as a tourist attraction since 1902 (with intervening spells as an explosives store, mushroom farm, and World War II air raid shelter) are well-known. Rod Le Gear is currently researching their archaeology, and their history from primary sources at, for example, the National Archives at Kew.

Just across the road from the 'caves' were further chalk mines at Camden Park, no longer accessible. Rod has collected together and reviewed all available evidence relating to these, and contributed a summary, with plans of the workings, published in the Kent Archaeological Review.

Despite the Chislehurst Caves' management's assertion, for tourists, that their tunnels date from Druid, Roman and Saxon times, an 18th - 19th century date for the greater part of the mines seems likely. And Rod suggests that the northern Camden Park mine was active c. 1800 - 1850s,

SOURCE: R.F. LE GEAR, 2007, Camden Park chalk mines, Chislehurst. Kent Archaeological Review 167, 146 - 152.

FORTHCOMING BOOK ON COTSWOLD STONE QUARRIES

Arthur Price, a former member of Subterranea Britannica, has authored a forthcoming book on Cotswold stone, due out in the Autumn. A review will appear in a future issue of Subterranea. Advance requests for details may be sent to Arthur Price, Frocester Court, near STONEHOUSE, Gloucestershire GL10 3TW.

ROY PAULSON [1929 - 2007]

The death of Roy Paulson has been announced, on 19 February 2007, aged 77. He was a long-standing member of the Peak District Mines Historical Society, and served that body as librarian, recorder, and treasurer for many years.

SOURCE: Lynn WILLIES, 2007, Obituary: Roy Paulson. Newsletter Peak District Mines Historical Society 122, page 2.

WATER FLOW STUDIES AT THE MEERBROOK SOUGH, WIRKSWORTH, DERBYSHIRE

The Carboniferous Limestone of the Wirksworth area in Derbyshire holds and allows to flow through it a quantity of groundwater, the aquifer being of some importance for local water supply. This water exists and flows through natural solution cavities in the limestone, and in and through joints and worked-out veins lead mines. Nine drainage adits, called soughs in the Derbyshire lead-mining districts, have been driven below the Wirksworth area, to allow miners to

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extract ore at deeper levels. The Meerbrook Sough is the latest, largest, and lowest of these drainage tunnels, extending to a total length of about eight kilometres including branches, developed and extended from 1772 to the 1880s. A recent paper presents the results of water-flow studies at this sough, and attempts to model the water flow and define the catchment area. The paper includes a coloured geological map shewing mine features and mineralised veins.

SOURCE: M.G. SHEPLEY, 2007, Analysis of flows from a large Carboniferous Limestone drainage adit, Derbyshire, England. Q. Jl. Engineering Geology and Hydrogeology 40(2), 123 - 135.

CONSEQUENCES OF CLOSING AND CESSATION OF DE-WATERING OF COAL MINES IN SOUTH DURHAM

Amongst the possibly insufficiently unforeseen consequences of closing coal mines is the rise in acidic groundwater levels, with increased dissolved iron and sulphates. When a mine is abandoned, pumping ceases, and the galleries flood. The large volume of water, with entrained and dissolved air, also permeates the loosely back-filled mine waste left underground. Iron pyrites (iron II disulphide) is oxidised and hydrolysed, leading to the water containing sulphuric acid and iron sulphates. In the south Durham coalfield, rising groundwater levels has no migrated into the Magnesian Limestone overlying the Coal Measures, resulting in solution of the calcium and magnesium carbonates of which this rock is composed. Unacceptably high levels of calcium and magnesium sulphates now threaten to contaminate the public water supply.

An old story! You close allegedly uneconomic coal mines. You then have to cope, expensively, with contaminated drinking water!

SOURCE: A. NEYMEYER, A., R.T. WILLIAMS, and P.L. YOUNGER, 2007, Migration of polluted mine water in a public supply aquifer. Q. Jl. Engineering Geology and Hydrogeology 40(1), 75 - 84.

ALVA SILVER MINES IN THE OCHIL HILLS, CLACKMANNANSHIRE

A recent article reviews the history of 18th century silver mining (with some associated cobalt ore production) at Silver Glen, Alva, in Clackmannanshire. In this part of the Ochil Hills the metallic ores occur within andesitic lavas, and apart from silver and cobalt there are also traces of copper and lead mineralisation. The Glen was once within the estate of Sir John Erskine [c. 1672 - 1739], which gentleman in 1715 engaged lead-miners from Leadhills in Lanarkshire to search for exploitable mineral wealth. On the discovery of a 12 ounce mass of silver, mining commenced, although with disappointing returns.

Alan Jeffreys' account presents available information on the nature and extent of the several underground workings, now sealed, with some photographs above and below ground, a location map, plans and sections of three formerly accessible mines, and short notes on four others. He concludes that more money was probably spent on the enterprise than it earned, there being numerous barren trials in search of what proved to be small quantities of ore.

SOURCE: Alan L. JEFREYS, 2007, The Alva silver mines. Bull. Grampian Speleological Group 4th Series 3(2), 18 - 25.

PRELIMINARY LISTING OF METALLIFEROUS AND LIMESTONE MINES IN SCOTLAND

Alan Jeffreys, one of a number of Grampian Speleological Group members engaged in documenting Scotland's mines (other than coal mines) has published a preliminary checklist of metalliferous and limestone mines in the country. This is based on, or taken from, a list published by the defunct Glasgow Speleological Society in 1968. He asks for supplementary information, corrections, and so forth. It appears likely that the NAMHO Annual Conference in 2008 will be based in central Scotland, and it is hoped to publish and up-to-date list on that occasion.

Alan's list at present is as follows;

Place	Mineral	NGR
Aberfoyle	Barytes	
Afton	Lead	NS 624006
Auchalton limeworks	Limestone	NS 330040
Auchenlongford	Haematite	NS 602299
Balgreggan	Limestone	NS 348048
Bannockburn	Limestone	NN 766906
Barjarg	Limestone	NX 822903
Barraston Burn		NS 602758
Benston limeworks	Limestone	NS 581158
Blairmore near Strone	Lead	?? 186834
Bridge of Weir	Limestone	NS 404656
Bridgend	Limestone	NS 350456
Carnshalloch	Limestone	NS 408100
Carsphairn	Ironstone	
Carswinning	Copper	NS 282530
Cessnock	Limestone	NS 510356

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Place	Mineral	NGR
Charleston and Millhill	Limestone	NS 930419
Clonbeith	Limestone	NS 336455
Corrie	Limestone	
Craigdullyeart	Limestone	NS 664155
Craigman	Graphite	NS 541125
Darnley	Limestone	NS 524588
Dunaskin	Ironstone	?? 450087
Duntocher		NS 490725
Eaglesham	Barytes	NS 569462
Gartloaning	Barytes ?	
Gass Water	Barytes	NS 670213
Gateside	Limestone	NS 370536
Glen Sannox	Barytes	NS 008452
Glencrerran	Copper	
Goldcraig (Crofthead)	Limestone	NS 318447
Gourock	Copper	NS 250762
Guiltreehill	Lead	NS 356108
Har Hill	Antimony	NS 657105
Howwood-Tor Bracken	Limestone	NS 409601
Inchgottrick	Limestone	NS 414337
Inchinnan		NS 480696
Kaim	Copper	NS 348613
Kerelaw	Limestone	NS 270430
Killoch	Limestone	NS 514315
Kirkcudbright		
Lannielane limeworks	Limestone	NS 313018
Lennoxtown		
Linn Caves	Limestone	NS 590755
Lylestone		NS 324464
Mansefield	Limestone	NS 640146
Millhilland Charleston	Limestone	NS 930419
Muirshiel	Barytes	NS 650290
Nethan Crags		NS 818466
Nutberry Hill	Lead	NS 744329
Queenzieburn	Limestone	NS 684784
Rotten Calder		NS 655519
Rotten Calder		NS 658538
Sandwick Lodge	Ironstone	
Sevenacres	Bauxite	NS 347455
Smithstone		NS 279455
Spearsbridge		NS 547591
Stair	Honestone	NS 436236
Strathaven	Limestone	NS 620394
Strathaven	Limestone	NS 728460
Strathaven	Limestone	NS 739460
Strontian	Lead	
Thorntonhall	Limestone	NS 594547
Todglen	Limestone	NS 344046
Toward	Talc	NS 144688
Treesbank	Limestone	NS 430330
Trochain	Limestone	NS 377098
Waulkmill Glen		NS 522580
Wiston	Limestone	?? 925320
Woohead	Lead	

SOURCE: Alan L. JEFREYS, 2007, Mine sites in Scotland. Bull. Grampian Speleological Group 4th Series 3(2), page 54.

UNDERGROUND MILLSTONE QUARRIES AT NIEDERMENDIG, GERMANY

Joern Kling's study of underground millstone quarries (some of them later used as beer cellars and / or adjuncts to breweries) at Niedermendig, about 23 km west of Koblenz, has recently been published in a volume of papers on millstone quarries. According to the English abstract, the basaltic lava of Niedermendig has been used for millstone production since the early Middle Ages. From the 16th century onwards extraction took place in mines [underground quarries] until the 20th century. Evaluation of historical maps clearly shows a shift of the extraction area from west to east. In the 19th century the abandoned quarries were used by up to 28 breweries as fermenting and storage cellars. An 'old cellar' within the original mining district and a 19th century brewery cellar were examined as representative samples and inventoried. All elements such as pits, extraction traces, inscriptions, barrel storage areas, safety devices etc were mapped and documented. Analysis of the orientations of extraction on the basis of wedge grooves allowed a reconstruction of the underground extraction fields and of the dynamics of extraction, as well as a determination of the associated extraction shafts.

The paper includes a vertical geological section through a shaft and associated underground quarry, a location map shewing the quarrying zone east of Mendig, and photographs and plans of underground features.

SOURCE: Joern KLING, 2006, Die unterirdischen mühlsteinbrüche von Niedermendig (Deutschland.) Historische kartographie und detail inventarisierung. IN: Alain BELMONT and Fritz HANGARTZ (edrs), 2006, Mühlsteinbrüche: Erforschung, Schutz und Inwertsetzung eines Kulturerbes europäischer industrie (Antike - 21 Jahrhundert), 133 -144 and 234.

METHANE EXPLOSION DEATHS AT YUBILEINAYA COAL-MINE, KEMEROVO REGION, SIBERIA, RUSSIA

The second methane explosion in two months at the Yubileinaya coal-mine in the Kemerovo Region of Siberia has resulted in at least 38 dead, seven injured, and three men missing. Attempts by Russian safety official to close the mine have so far been thwarted. The mine is owned by the firm Yuzhkuzbassugol, a subsidiary of the coal and steel concern Evraz SA which is part-owned by one Roman Abramovich.

SOURCE: ANON, 2007, 38 dead in blast at mine attacked over safety. The Guardian, 25 May 2007, page 21.

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PRIVATE COLLIERY OWNER SENTENCED TO LIFE IMPRISONMENT FOR COVERING-UP AN ILLEGAL MINING OPERATION AND FATAL ACCIDENT IN CHINA

Wang Jianjun, a private colliery owner, has been jailed for life for failing to report a methane explosion at a small mine at Miaojiang in Shanxi Province. The mine was closed down by the authorities in 2006, but illegally re-opened in February 2007. On 18 March 2007 a gas explosion trapped 21 miners underground. The owner cut the cables in the pit shaft, and in response to enquiries claimed the mine was still closed. Other miners were ordered to stay at home, and the victims' relative were moved to a neighbouring province and promised payment to keep quiet. All this delayed rescue operations for almost two days, and the 21 miners had by then died.

Alongside the jailing of the owner, eight local civil servants and 13 other persons who attempted to conceal the accident were also sentenced.

China has an appalling mining safety record. In 2,006 4,746 persons died in 2,845 recorded accidents, although it seems likely that many more accidents went unreported. The Chinese communist government plan to force the closure of some 4,000 unsafe mines.

SOURCE: Jonathan WATTS, 2007, Chinese mine owner jailed for delays that killed workers. The Guardian, 2 May 2007, page 20.

THE ARGO GOLD MILL AND TUNNEL, IDAHO SPRINGS, COLORADO, USA

A mining-related visitor attraction at Idaho Springs, about 40 miles west of Denver, has been described by a recent visitor. A small gold-processing plant in a five-storey mill operated from 1913 until 1943. Many of the wooden fixtures and fittings are preserved in situ, although those of metal were largely sold off for scrap during the war years.

The mines were some distance away, and the mill was served by the 4.2 miles Argo tunnel, from Central City, driven in the years 1893 - 1910. This is reported to be up to 12 feet in diameter, but has been closed since an explosion in the mines released a flood of water which drowned four miners. The tunnel had also served for mine drainage. Further information is www.historicargotours.com .

SOURCE: John PIGGOTT, 2007, The Argo Gold Mill and Tunnel, Colorado, USA. Newsl. Peak District Mines Historical Society 122, 5 - 6.

NAICA MINE, CHIHUAHUA, MEXICO

A double-page spread colour photograph in The Guardian recently featured an array of enormous white crystals in the Cueva de los Cristales in Naica and, beside them, a standing human figure for scale. It can be seen that the crystals are from two to three metres long, and up to half a metre wide. It is claimed they are the 'largest crystals in the world' and were found in 2000 after water was pumped out of the mine. Unfortunately the crystals are not chemically or mineralogically identified, and it is not stated what the mine is or was worked for. A letter in a subsequent issue of the paper identified the crystals as gypsum (calcium sulphate 2-hydrate) and made a plea for the conservation of this site, and of earth science sites in general.

SOURCES: ANON, 2007, Eyewitness: Chihuahua, Mexico. The Guardian, 26 April 2007, 20 - 21; Murray GRAY, 2007, Save our rocks. The Guardian, 28 April 2007, page 35.

GOLD RUSH AT APUI, BRAZIL

According to recent reports, thousand of would-be miners are flocking to a tiny Amazon outpost after rumours of the discovery of a 'new Eldorado', rumours that have sparked a desperate rush for gold and fears for the environment (Tom Phillips, The Guardian, 11 January 2007.) Local Brazilian newspapers claimed that at least 3,000 arrived in the small town of Apui, in the state of Amazonas, early in January, when traces of gold were found on the banks of the Juma river, 50 miles north of the town. An editorial in the Diario do Amazonas newspaper has fuelled fears that opportunistic mining would leave 'a trail of environmental and social' destruction, contaminating rivers with mercury, encouraging deforestation and bringing the threat of an explosion in drug use and violence to the backwater town.

SOURCE: ANON, 2007, Novo Eldorado. Geology Today 23(2), page 42.

NEWS - MISCELLANEOUS

RUMOURED DEAD BODY TRAIN - LONDON HOSPITAL BASEMENT TO WHITECHAPEL

A short note in the London Railway Record mentions a rumoured 'dead body train' which 'conveyed corpses from the basement of the London Hospital to Whitechapel.' The author of this note says that in 45 years studying London's railways he had 'never heard of this' until recently, when he heard it on the Sky History Channel programme 'Ghosts on the Underground.'

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The London Hospital was established in 1740 at Whitechapel Road, London E1, and considerably extended and modernised in the 20th century. Whitechapel LU Station is nearby. An authoritative two-volume history of the Hospital has no index entries for mortuary, railway, or tunnel; and, so far as can be ascertained from a quick skim, nothing in the text either. Volume II (1840 - 1948) contains plans of the Hospital in 1886 and 1909, neither of which suggest a tunnel link to Whitechapel Station which has surface platforms (1884) on the District Line and subsurface ones (1876) on the East London Line.

There was, of course, a well known London Necropolis Station next to Waterloo which conveyed corpses (single tickets only) to Brookwood Cemetery. Class distinctions were maintained after death. Your cadaver could be conveyed in a 1st class compartment, or go alongside the lower orders. Accompanying mourners (with return tickets) of course also had matching tickets.

SOURCE: David GILBERT, 2007, Dead body train. London Railway Record 52, page 251.

SOURCE: A.E. CLARK-KENNEDY, 1962 - 63, The London: a study in the voluntary hospital system I - II. : 264 + 310 pages.

EARTHQUAKE AT FOLKESTONE, KENT

A magnitude 4.2 earthquake occurred at Folkestone at 08.18 on 28 April 2006, resulting in damage to chimney pots and walls near the epicentre. The focus has been determined as about two kilometres below the town. Earthquakes of this magnitude occur in or around the British Isles about every five years, the last being a 4.7 event near Dudley in the West Midlands in 2002. The best-known English earthquake was near Colchester on 22 April 1884, when there was extensive damage to buildings at Wivenhoe. Your Chairman felt the North Wales earthquake of 19 July 1984 whilst at Liverpool.

Interestingly, earthquakes are known not to have much effect on mines or other underground spaces. This has been known since studies in the Leicestershire / Nottinghamshire coalfield in 1893 and 1904, and near Swansea where observations were made of the effects (found to be minimal) in coal mines of an earthquake on 27th June 1906. An earthquake near Maastricht in the Netherlands in 1992 caused widespread damage to buildings, but had little effect on the region's numerous underground limestone quarries. The limited effects underground are presumably the result of mine galleries being shaken as rigid structures, whereas the unrestrained tops of building and chimneys can wobble. So reports of damage underground from our colleagues in the Kent Underground Research Group are not expected.

The so-called Richter Scale, developed by Charles F. Richter [1900 - 1985] and Beno Gutenberg [1889 - 1960] of California Institute of Technology is no longer used, as it is valid only within restricted frequency and distance ranges (earthquakes generating more than one kind of wave), and has been superseded by Moment Magnitude, defined by Tom Hanks and Hiroo Kanamori (also of CIT) in 1979.

Charles Davison [1858 - 1940] published an overview of British earthquakes in 1924, containing a catalogue of events including ones at Reigate, London, and Maidstone.

References:

ANON, 1993, Earthquake hazard and risk in the UK. Department of the Environment: 32pp.

Charles DAVISON, 1907, The Swansea earthquake of June 27th, 1906. Quarterly Journal of the Geological Society 63(3), 351 - 361 + pl. xxv (map)

Charles DAVISON, 1924, A history of British earthquakes. CUP: xviii + 416pp
[Includes a catalogue of earthquakes. Chapter XVII is on Earthquakes in the south east of England including Reigate (pages 331 - 332), London (332 - 336), and Maidstone (332.)]

Alice WALKER and Roger MUSSON, 2007, Kent rocked. Geoscientist 17(6), page 6 and Ted NIELD, 2007, Off the scale, ibid, page 2.

SMITHFIELD MARKET'S UNDERGROUND GOODS STATION, LONDON

Carl Shillito, of the Railway and Canal Historical Society, is researching the underground goods station at Smithfield, which facility remained in use until 1962, and seeks assistance with photographs. It was the work of Sir John Fowler [1817 - 1898] Contact SB Chair Paul Sowan if you can help.

SOURCE: Carl SHILLITO, 2007, Wholesale market sidings. Bull. Railway and Canal Historical Society 408, page 7.

COLINDALE NEWSPAPER LIBRARY (LONDON) TO MOVE TO BOSTON SPA (YORKSHIRE)

The British Library announced in March 2007 plans to move its historic newspaper collection from Colindale in north London to its premises at Boston Spa in

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Yorkshire. It is expected that by 2011 access to the material will be at the main St. Pancras building by means of digital copies or microfilm only. Access to the fragile original newspapers will be allowed only in 'exceptional circumstances.' The British Library's position is that alongside the duty to make the material access to current researchers is the over-riding duty to preserve it for future researchers, a century and more ahead. Apparently at present 15% of the collection cannot be made available for research, on account of the poor state of preservation of the newsprint; 34% of the collection is already available in digital ot microfilm form; and fewer that 1% of researchers' requests cannot at present be met by producing the original or a copy. Unlike Colindale, researchers will have to obtain a British Library reader's ticket for access to historic newspapers at St. Pancras.

SOURCE:
www.bl.uk/news/2007/pressrelease20070301.html [via the Federation of Family History Societies' website]

THE BERLINER U-BAHN MUSEUM, GERMANY

Berlin's underground railway museum is at the Olympia-Stadion U-bahn station on line U2. It is staffed by volunteers, and open reportedly only on Saturdays. The website is www.ag-berliner-u-bahn.de

LIVING UNDERGROUND

A photo-feature in The Guardian recently depicted cave dwellings at 'Rock Cottage, an 18th-century rock-cut dwelling at Wolverley (Worcestershire), an unidentified troglodytic home in France, a 12th-century example at Gaudix (Spain: Granada), 14th-century cave homes at Matmata (Tunisia), 8th-century ones at Uchisar (Turkey: Cappadocia), and an underground school at Ziyang (China.)

SOURCE: ANON, 2007, Dig the new home. An estate agent in Worcestershire is offering a cave converted into a cottage for £ 25,000. In Britain, cave-dwelling has not been common for thousands of years - but around the world it's a different story. The Guardian G2, 3 July 2007, 14 - 15.

BATS IN PRISONS AND PRISON GROUNDS

A number of British prisons include former military structures in their grounds including, for example, World War II bunkers and air-raid shelters. The Home Office's Custodial Property Estate is collaborating with the Bat Conservation Trust in formulating a Biodiversity Action Plan. A recent report focuses on how this is being put into action at the Isle of Sheppey prisons where, for example, 'bunkers' (perhaps just air-raid shelters) are being seen as ideal undisturbed winter hibernation sites. The main minor modification required are the installation of artificial 'bat crevices' for the animals to squeeze into to hibernate (only the two species of horseshoe bats hibernate hanging free) and simple measures to control the internal microclimate, especially the humidity. Unmodified bare concrete bunkers are not much favoured by bats, as there tend to be few such crevices. Brickwork with much of the mortar missing is ideal.

Active military sites, to which access is severely limited, can also be ideal wildlife conservation sites. The Burghfield nuclear weapons site at Reading has flourishing bee orchids, for example. And RAF Chilmark, an old underground building-stone quarry in Wiltshire converted for munitions storage (now out of use) was a well-protected bat hibernaculum.

SOURCE: Phil THOMAS, 2007, Bats behind bars. Bat Chat 83, 10 - 11.

ISLE OF STAFFA SEA CAVES: A SUPPLEMENTARY REPORT

Members of the Grampian Speleological Group have made a return visit to Staffa to study the numerous sea-caves, on which John Crae has published a further illustrated report.
SOURCE: John CRAE, 2007, Updating Ossian Caving. Bull. Grampian Speleological Group 4th Series 3(2), 43 - 52.

THE NATURAL ICE COMPANY'S UNDERGROUND ICE STORE AT RANSOME'S DOCK, BATTERSEA, LONDON

The Natural Ice Company constructed an underground ice store (an industrial-scale ice-house) at Ransome's Dock, Battersea, in the 1890s. This was to hold block ice imported by ship from such places as the Norwegian fjords. The enterprise passed into the control of the United Carlo Gatti Stevenson Slater Company, an amalgamation of block ice trade merchants, in the early 1900s. During the 1920s, with advances in refrigeration technology, the store was replaced by an ice-making plant above ground.

Carlo Gatti (1817 - 1878), an Italian, came from Switzerland to London in 1847, and has been described as the person who 'may have been the first person to sell ice cream in the United Kingdom' using ice from Norway.

A small display about Carlo Gatti is at Battersea Library at 265 Lavender Hill [Email: localhistory@wandsworth.gov.uk]

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An (empty) sub-surface ice storage pit can be seen at the Canal Museum near King's Cross Station.

SOURCE: ANON, 2007, Carlo Gatti and the United Carlo Gatti Stevenson Slater Company at Ransomes Dock, Battersea (1902 - 1977.) Wandsworth Museum Newsletter, Summer 2007, page 4.

ICE STORAGE CAVES AT NEWHAVEN, EAST SUSSEX

An article on the Earl of Sheffield's tramway, which served the Meeching chalk pit at Newhaven, notes in passing that there were ice storage 'caves' at that town.

SOURCE: John BLACKWELL, 2007, The Earl of Sheffield's tramway. Newsl. Sussex Industrial Archaeology Society 134, 9 - 10.

HYDROFRACTRURING TO INCREASE WATER WELL YIELDS IN INVERNESSHIRE AND WESTER ROSS, SCOTLAND

Much of the bed rock in the Scottish Highlands is crystalline pre-Cambrian metamorphic rock of very low porosity and permeability. Water wells in such terrain tap groundwater held in open joints and fissures, with generally low yields. A recent paper describes a technique trialled at Alligin (Wester Ross) and Laggan Bridge (Invernesshire) whereby very high water pressures are used to widen existing fractures, and to create new ones.

SOURCE: J. COBBING, and B.É.Ó. DOCHARTAIGH, 2007, Hydrofracturing water boreholes in hard rock aquifers in Scotland. Q. Jl. Engineering Geology and Hydrogeology 40(2), 181 - 186.

RENOVATION OF BRUSSELS' CENTRAL STATION, BELGIUM

In the 1950s Brussels' two principal railway termini, North and South, were linked by tunnelling below the city centre. A new central station (Bruxelles Central / Brussel Centraal) was created, with sub-surface platforms reached via a surface building with its booking hall clad in ornamental limestone. This had become somewhat shabby, and is now being renovated, having due regard for the architectural and historic value of the structure.

The central station is in the part of Brussels most visitors come to see, a short distance from the Grande Place / Grote Markt. The south station (Midi / Zuid), where Eurostar trains terminate, is in an unattractive location, while the north station (Nord) is convenient for, amongst other attractions, the red light district. Almost all local and long distance trains serve all three stations, and Eurostar tickets are valid for the short hop to the centre.

MEDIEVAL UNDERGROUND ART IN THE SINT-PIETERSBERG UNDERGROUND LIMESTONE QUARRIES, MAASTRICHT, THE NETHERLANDS

An illustrated booklet has been published dealing with medieval drawings found on the walls of the underground building-stone quarries in and around Sint-Pietersberg, the hill lying to the south of Maastricht.

DETAILS: Femke SPEELBERG and Jacoline ZILVERSCHOON, 2007, 'Zotheid' in de duisternis: Middeleeuwse tekeningen in de Sint-Pietersberg. Rotterdam: Nijmegen University Press: 72pp [ISBN 978-90-86900916]

NEWS - PUBLICATIONS

A NEW BOOK ABOUT THE REIGATE 'CAVES' AND OTHER UNDERGROUND SPACES, EAST SURREY

Malcolm Tadd, an honorary member and former Secretary of Subterranea Britannica, and President of the Wealden Cave and Mine Society, has completed a new book about the several 'caves' at Reigate, those excavated into the sand as well as other underground sites in and around the town. He has had over 40 years' experience of visiting underground sites in east Surrey, interviewing persons associated with them, and collecting or reading relevant documentation.

Although the book's title declares it to deal with the town centre, it includes two sites a kilometre or so to the north, up Reigate Hill. It excludes any detailed account of the so-called Barons' Cave within the remaining earthworks of Reigate Castle, as that has recently been the subject of a separate booklet by Peter Burgess' The Barons' Cave, Reigate: a guide (Wealden Cave and Mine Society 1994 / reprinted 2003.) The building-stone quarry tunnels and hearthstone mines of Colley Hill and Reigate Hill are also excluded, much information on these having been published in Peter Burgess' East Surrey underground (2006.)

The sites described, in approximate order of antiquity, are a medieval undercroft, several sand mines (18th - 19th century), England's oldest road tunnel (1824), Reigate 'Fort' (1890s), the so-called 'Monty's Hideout' (World War II), and the former Cold War 'bunker' under the Town Hall. A sketch-map on page 4 locates, approximately, some but not all of these. A number of

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these sites are no longer or not currently accessible.

The style is very readable; factual details are accurate; popular errors and misconceptions are corrected; ascertained fact and conjecture are carefully distinguished; and areas of continuing historical uncertainty are presented as such. Of especial interest is the publication for the first time of documentation and oral evidence relating to World War I army work in the West mine, and World War II military work at Reigate Hill.

There is an attractive colour photograph taken inside the Tunnel Road West sand mine on the front cover, and 10 other black-and-white illustrations. The addition of a reproduction of the only know depiction of the stone-built former Castle would have usefully complemented the discussion of that structure. References to sources and further reading are included within the text. There is a good index. The work contains valuable and hitherto unpublished information, admirably presented and discussed, on largely unknown or misunderstood aspects of Reigate's history.

The book, published by Peter Burgess, is available at £ 6 + £ 1 postage and packing from the Wealden Cave and Mine Society at 13 Beaufort Road, REIGATE, Surrey RH2 9DQ (treasurer@wcms.org.uk) It is understood that any profits made from the sale of this work will go to the Wealden Cave and Mine Society.

DETAILS: M.H. TADD, 2007, Underground Reigate: the sand-mines and underground spaces within the town of Reigate in Surrey. Crawley: Peter Burgess: 52pp [ISBN 978-0-9556081-0-0]

BRITISH MINING [MEMOIRS NORTHERN MINE RESEARCH SOCIETY] 80 - 82 (2006 - 2007)

The latest issues of British Mining (numbers 80 - 82) contains papers as follows:

CALLANDER, Ron M., 2006, The Louisa mine revisited. British Mining [Memoir Northern Mine Research Society] 80, 88 - 93 [Dumfriesshire: antimony mine worked at Jamestown, c. 9 miles north of Langholm, 1793 - 98, 1888 - 91 and 1919 - 22]

CHAPMAN, Nigel A., 2006, Tapping drowned workings, Thornley and Wheatley Hill Collieries. British Mining [Memoir Northern Mine Research Society] 80, 28 - 32 [Durham: reviews problems resulting from flooded unknown coal mines encountered by miners, and workings deliberately flooded to extinguish underground fires; describes the successful dewatering of flooded workings at Thornley colliery using bores and a drift driven from Wheatley Hill colliery in 1900]

CHAPMAN, Nigel A., 2007, The Van mines. British Mining [Memoir Northern Mine Research Society] 81A 144 pages [The whole issue is a monograph on the Van lead mines near Llanidloes in central Wales]

GOODCHILD, John, 2006, Further aspects of Old Flockton collieries near Wakefield. British Mining [Memoir Northern Mine Research Society] 80, 4 - 12 [Yorkshire: Lane End and Emroyd coal mines worked 1772 - 1893: includes details of the New Hall waggonway operated c. 1800 - 1893 which included a tunnel and a 20-arch viaduct]

GOODCHILD, John, 2006, A Yorkshire colliery at work: the North Gawber and Woolley collieries, 1896 to 1915. British Mining [Memoir Northern Mine Research Society] 80, 13 - 27 [Yorkshire: The Lancashire & Yorkshire Railway's Barnsley branch line c. 1 mile long opened 1 January 1850 to serve North Gawber etc]

JAMES, David M.D., 2006, The Cymystwyth mines, Ceredigion, Wales, UK: a revision of lode geometry from new surface geological mapping. British Mining [Memoir Northern Mine Research Society] 80, 33 - 59.

JAMES, David M.D., 2006, Lode geometry in the Plynlimon and Van Domes, central Wales, UK: the relative importance of strike swing and relay linkage. British Mining [Memoir Northern Mine Research Society] 80, 60 - 87.

JOHNSON, David S., 2006, Foredale Quarry, Helwith Bridge, a historical and archaeological survey. British Mining [Memoir Northern Mine Research Society] 80, 111 - 134 [Yorkshire: quarries formerly and currently worked for crushed stone, flagstone, limestone, etc]

SMITH, Richard, 2006, Radiocarbon daring of early lead smelting sites. British Mining [Memoir Northern Mine Research Society] 80, 94 - 110.

TYSON, Leslie Owen, 2007, Mashamshire collieries. British Mining [Memoir Northern Mine Research Society] 82: 160 pages [The whole issue is a monograph on the coalfield and coal mines in Colsterdale, Yorkshire]

AVAILABILITY: NMRS Publications, John Hunter, 3 Leebrook Drive, Owlthorpe, SHEFFIELD S20 6QJ [Email miner@aditlevel.co.uk]

THE FACTORY INSPECTORS

Eddie Crooks' new book, The factory inspectors: a

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legacy of the industrial revolution, traces the history of governmental inspection and regulation of factories from the Health and Morals of Apprentices Act of 1802 until relatively recent times.

Although HM Inspectors of Mines and Quarries were designated also as HM Inspectors of Factories insofar as manufacturing processes carried on at mine and quarry sites (ore beneficiation or other processing, brick and tile-making, lime-burning, and so on), this aspect of their work receives little or no attention in this book.

DETAILS: Eddie CROOKS, 2005, The factory inspectors: a legacy of the industrial revolution. Stroud: Tempus Publishing Ltd: 222pp [ISBN 0-7524-3569-8]

CHAPELS IN UNDERGROUND LIMESTONE QUARRIES IN ZUID-LIMBURG, NETHERLANDS

This impressively well produced A4 hardback, published in Dutch in a limited edition of 150 copies, describes 13 rock-cut underground chapels within some of the underground building-stone quarries in the Upper Cretaceous limestones in and around Maastricht, Valkenburg, and the surrounding area in the far-south Dutch province of South Limburg. None are described in the similar quarries on the Belgian side of the border. The work is well-illustrated in colour and black-and-white, including a distribution map, plans of the chapels (produced by our member Joep Orbons), and photographs of rock-cut architectural details, altars, pulpits, fonts, seats, arcosolia, and sculptures all carved in the in-situ limestone. Mural drawings and paintings are also featured. A section is devoted to World War II underground chapels.

DETAILS: Fons LEUNISSEN, 2007, 'De plaets waar Gij staet, is heilig.' Kapellen in de Onderaardse Kalksteengroeven van Zuid-Limburg. Maastricht: Studiegroep Onderaardse Kalksteengroeven / Silvertant Enterprises: 291pp [ISBN 978-90-805212-6-1]

STUDIEGROEP ONDERAARDSE KALKSTEENGROEVEN - MEDEDELINGEN 46

Our sister society in the Netherlands, Studiegroep Onderaardse Kalksteengroeven (the Underground Limestone Quarries Study Group) has recently published the latest issue of its journal, Mededelingen) which contains the following paper concerning medieval graffiti in the underground limestone quarries at Sint-Pietersberg, Maastricht. This deals with carbon-dating applied to the graffiti, and historical and stylistic studies.

SOURCE: BLAAUW, Henk, 2007, Lambier le Pondeur: een fascinerend middeleeuws handschrift in de Sint Pietersberg. Mededelingen Studiegroep Onderaardse Kalksteengroeven 46, 2 - 32.

BERLIN'S UNDERGROUND, GERMANY

The eighth edition of an illustrated hardback volume, the title of which translates as 'The dark (or mysterious) world: bunkers, tunnels, and vaults under Berlin', was published in May 2007. Publication of the first edition in 1997 led to the formation of the voluntary organisation Berliner Unterwelten e.V. which organises public guided visits to World War II and Cold War shelters and to the Humboldthain flak tower in the Gesundbrunnen district to the north of the city centre.

The book describes and illustrates the history of Berlin with particular reference to underground works of all sorts, from fortification vaults and powder magazines of the early city and beer cellars to the sewers, water supply infrastructure and the U-bahn (underground railway system) to wartime and cold war shelters and bunkers. The book is well illustrated (photographs in colour and monochrome by Frieder Salm.) Berlin's former pneumatic post system is described and explained, as are tunnels made by escaping east Germans in the days of the Berlin Wall.
DETAILS: Dietmar ARNOLD and Ingmar ARNOLD, 2007, Dunkle Welten: Bunker, Tunnel und Gewölbe unter Berlin. 8th edition. Berlin: Ch. Links Verlag: 240pp [ISBN 978-3-86153-444-0]

BERLIN'S UNDERGROUND RAILWAY STATIONS, GERMANY

The Berlin U-Bahn is Berlin's equivalent of London's Underground or the Paris Metro. As Berlin is low-lying and on waterlogged sands and gravels, there are no deep bored tunnels. The system is mainly of cut-and-cover or surface lines or (as in Paris) in some parts elevated. This book illustrates in colour all 192 underground and elevated stations on lines U1 to U9, and coincides with the system's 100th anniversary. This was Europe's 5th metro system after those of London, Glasgow, Budapest and Paris. Until 1928, trains were worked by steam locomotives. An introduction and captions are in English as well as German. Most of the views are subsurface or elevated platforms views, although a few are of exteriors of surface station buildings.

DETAILS: Robert SCHWANDL, 2002, Berlin U-Bahn album. Berlin: metroPlanet: 144pp [ISBN 3-936573-01-8]

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THE NEW BERLIN HAUPTBAHNHOF (CENTRAL STATION), GERMANY

Historically, Berlin's mainline railway stations were all termini distributed, as in London, around the city perimeter. In time, the city's local above-ground line was built on an east-west viaduct right through the centre, and this subsequently accommodated (as it still does) two tracks for the local trains and two for main-line services. Thus the city centre came to be served by several stations at which national and international services called - from west to east these included the Zoologischer Garten, Lehter, Friedrichstrasse, Alexanderplatz, and Ost stations. When Berlin was divided by 'the wall', Friedrichstrasse effectively became two stations.

Brussels linked its North and South terminus stations with a tunnel below the city and a new Central main line station in 1952. In London we have Thameslink linking London Bridge and King's Cross stations, but are still waiting for Crossrail to allow standard loading gauge trains to run west-east between Paddington and Liverpool Street.

Lehrterbahnhof has now been rebuilt as a massive railway interchange station on five levels, of which three will serve east-west or north-south railway tracks. Either side of the topmost trainshed and towering and bridging over it is a massive development of office accommodation. On the top floor are the west-east Stadtbahn and main DB (Deutsche Bahn Aktiengesellschaft) platforms. One of the lower levels supports north-south DB tracks on the line northwards from Jüterbog via Potsdamerplatz to Oranienburg and Rostock on the Baltic coast, which runs in tunnel below the city centre. A new north-south U-bahn (underground) line is also, currently, under construction.

Erich Preuss' book describes and illustrates the history of Berlin's mainline railways, and the planning and construction of the Hauptbahnhof and its associated north-south tunnels.

DETAILS: Erich PREUSS, 2006, Berlin Hauptbahnhof. Berlin: Trans Press: 160pp [ISBN 978-3-613-71273-7]

SECRET UNDERGROUND BUNKERS, EASTERN GERMANY

Stefan Best's book on secret underground bunkers of the former East Germany contains numerous plans, sections, and perspective and other drawings of these structures, and also a selection of photographs (some in colour) of their exteriors and interiors.

DETAILS: Stefan BEST, 2004, Geheime Bunkerlagen der DDR. Stuttgart: Motorbuch Verlag: 216pp [ISBN 3-613-02332-6]

STUDIES IN SPELEOLOGY

Volume 15 of Studies in Speleology, published by the William Pengelly Cave Studies Trust, contains the following papers:

PEARMAN, Harry, 2007, User-defined cave surveys. Studies in Speleology 15, 27 - 44 [Our honorary member Harry Pearman, professionally an IT Consultant and database designer, has been exploring and surveying man-made underground features and natural caves from 1955; in this paper he argues for an advance from paper-based surveys (awkward to use and having a limited life underground) to electronically held data-sets (including the preservation of all survey data) from which users can select and print such detail as they require, including the use of colour. Samples of surveys from the Godstone Hill quarries and hearthstone mines in east Surrey, and Whitewater Cave, are included by way of illustration.]

SHAW, Trevor, 2007, Travellers to tourists - cave visitors to Slovenia. Studies in Speleology 15, 3 - 21 [This deals with extant records, published and otherwise, relating to travellers' and tourists' visits to eight caves in the limestone karst around Postojna in Slovenia between 1737 - 1900]

WALL, Ian, 2007, Extending the management remit - the true value of cultural heritage. A case study at Creswell Crags. Studies in Speleology 15, 45 - 57 [Describes the establishment and development of a visitors' and interpretation centre at the caves at Creswell Crags, an important geological and archaeological site straddling the Derbyshire / Nottinghamshire border]

[The William Pengelly Cave Studies Trust Ltd website is http://www.pengellytrust.org/]

SOCIÉTÉ FRANCAISE D'ÉTUDE DES SOUTERRAINS - SUBTERRANEA

Issues 140 (December 2006), 141 (March 2007) and 142 (June 2007) of Subterranea have been received from our sister society in France. The principal contents are as follows:

AVRILLEAU, Serge, 2007, Les silos à blé de Foggia (Italie) et les silos à riz de Meuong-Ngan (Laos_ Subterranea 142, 52 - 59 [Underground storage of grain, rice &c]

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BAROUSSE, Vincent, 2007, Les carrières souterraines de l'Aisne: un patrimoine méconnu. Subterranea 142, 34 - 40 [Underground building limestone quarries]

KHAN, Claude, 2006, Récapitulatif des sommaires de Subterranea du no 1 (1972) au no 99 (1996.) Inventaire par auter (1ère partie A - L) Subterranea 140, 104 - 127.

KHAN, Claude, 2007, Récapitulatif des sommaires de Subterranea du no 1 (1972) au no 99 (1996.) Inventaire par auter (2ème partie M - Z) Subterranea 141, 12 - 32.

KLEINMANN, Dorothée, 2007, Du côté des Erdställe (Résumés et traductions de textes extraits de "Der Erdstall" no 31 - 2005. Subterranea 141, 8 - 11.

RALLON, Marcel, and Michel ROUILLARD, 2007, Aqueduc du Gier Subterranea 141, 2 - 7.

RALLON, Marcel, 2007, Petite piqûre de rappel: risque d'asphyxie en milieu hostile. Subterranea 142, 60 - 64 [Deals with risks of oxygen deficiency, methane, carbon dioxide, carbon monoxide, and hydrogen sulphide underground]

SEGALAT, Joel, 2006, Résau souterrain des Roches et souterrain-refuge des Roches à Scorbé-Clairvaux (86.) Subterranea 140, 98 - 103.

STEVENS, Luc, 2007, Apercu des souterrains de la Vienne. Subterranea 142, 41 - 51.

Copies of this journal are held by the Chairman.

Société Francaise D'étude des Souterrains is at http://www.chez.com/sfes - Emails to sfes@chez.com

NEWS - TUNNELS AND TUNNELLING

UK NATIONAL UNDERGROUND ASSET GROUP (NUAG)

The UK National Underground Asset Group (www.nuag.co.uk) was set up in 2005 to help the Department for Transport achieve targets introduced in the 2004 Traffic Management Act (Elizabeth II, Chapter 18, 2004) for the exchange of information on underground assets.

NUAG's plan is for all available information on underground assets (and associated above-ground assets as appropriate) to be shared to be shared between stakeholders in a consistent way, and on-demand. The utilities alone undertake around 1.5 million streetworks annually, at an annual direct cost in excess of £ 1.5bn. Part of this is attributable to 'holes-in-the-road' in which nothing is found, and another part (£ 150m) to damage to third-party assets. And delays to road-users, disruption of business, mitigation of environmental damage, and safety costs have been estimated at £ 5.5bn pr annum.

The growth of broadband services and planned updating and improvement of existing utilities will lead to many more excavations. The idea, in simple terms, is to get the gas, electricity and water companies to share their data on the locations of their buried pipes and cable and subterranean voids to their mutual (and the public) advantage.

There are links with an existing scheme known as Mapping the Underworld (http://www.mappingtheunderworld.ac.uk) and another called Vista (http://vistadtiproject.org/site/vista.home)

SOURCE: James BRAYSHAW, 2007, Solving the puzzle of Britain's underground assets. Civil Engineering 160(2), page 52.

CENTENARY OF THE CHARING CROSS, EUSTON & HAMPSTEAD RAILWAY (NOW PART OF THE NORTHERN LINE), LONDON

Public services commenced on the Charing Cross, Euston & Hampstead Railway on 22 June 1907. The line (now part of the Northern Line) was the third and last of the deep-level tubes promoted by the American financier Charles Tyson Yerkes [1837 - 1905], the earlier ones being the beginnings of what became the Bakerloo and Piccadilly lines.

The line ran from Charing Cross to a terminus at Golders Green (the only surface station), with a branch from Camden Town to Highgate. A number of the stations have subsequently been re-named, and one (South Kentish Town) closed.

An article by J.E. Connor features historic photographs of surface station buildings and subsurface platform views of Belsize Park, Golders Green, Hampstead, and Tufnell Park Stations (surface), and Euston Road, Hampstead, and Highgate Stations (subsurface.)

SOURCE: J.E. CONNOR, 2007, Centenary of the Hampstead Tube. London Railway Record 52, 233 - 239.

IMPROVEMENTS PLANNED FOR VICTORIA UNDERGROUND STATION, LONDON

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London Underground's station at Victoria, with Circle, District, and Victoria Line services, suffers severe congestion, especially in the morning rush-hour. LU have appointed civil engineering firm Mott Macdonald to carry out £ 509m worth of works to be completed by 2014 to increase the station's capacity by about half, with a new ticket hall, lifts, and escalators to ease congestion and provide step-free access from street level to all platforms. Construction is likely to start in 2009. Nine new escalators and seven new lifts are envisaged. The station at present handles over 75m passengers per annum. Further details are at http://tfl.gov.uk/corporate/media/newscentre/4958/aspx)

SOURCE: ANON, 2007, Victoria project will allow for growth in Tube use. Railondon 96, page 4.

PROPOSED THAMES STORM TUNNEL, LONDON

Doubt has been cast on the proposed Thames storm water tunnel representing value for money by Professor Richard Ashley of the University of Sheffield. The 32km tunnel (longer than some tube lines), of 7.2m diameter, would run from Chiswick to Beckton largely below the bed of the river Thames, at depths below the surface of up to 80m. Estimates of the cost have varied from £ 2bn to £ 10bn. The intention is to accommodate the 20 Mm3 of storm flow currently discharged untreated to the Thames as the present sewers lack the capacity to convey it.

SOURCE: Jon YOUNG, 2007, Thames storm tunnel is a white elephant says academic. New Civil Engineer, 31 May 2007, page 5 [London: sewers]

PROPOSED NEW NORTHOLT - LONDON HEATHROW RAILWAY TUNNEL

England's first modern high speed railway line, the Channel Tunnel Rail Link (now renamed High Speed 1 or HS1) is due to come into public service in November 2007, with trains from London St. Pancras to Brussels and Paris. Thoughts are now turning to the possibility of extending this via a proposed HS2 to the Midlands, allowing direct links from Manchester to the Belgian and French capitals in two and three quarter hours to Brussels and three hours to Paris. This would also allow London to Manchester journeys, for example, taking 90 minutes (currently 130 minutes.) Part of this scheme is a spur linking the main line from Northolt to London Heathrow Airport via a new five mile tunnel. Double-deck high speed trains are envisaged, such as are commonly seen in France and Germany,

SOURCE: Ben WEBSTER, 2007, London to Midlands in 45 min. on a double-deck express train. The Times, 19 June 2007, page 8.

EAST LONDON LINE AND THAMES TUNNEL TO CLOSE 2007 - 2010 - CROYDON TO APPEAR ON THE LONDON UNDERGROUND MAP

The East London Line, including the Thames Tunnel, is to close for modernisation from 22 December 2007, and will re-open with the inauguration of a new train service in 2010. This will see the line to Croydon featuring on the London Underground map. However, 'bringing the tube to Croydon', as the local paper puts it, will not mean new tunnelling. It will mean a 'tube-like' service (every 15 minutes according to the latest report) from West Croydon to London via the East London Line and Thames Tunnel, stopping presumably at all stations via Norwood Junction and Forest Hill, etc., etc. Those wishing to go to central London or the West End will still find the fast trains from East Croydon to London Bridge or Victoria, every ten minutes or so, a better bet - stopping only at Clapham Junction or Norwood Junction in some cases.

SOURCE: Peter HENDY, 2007, Croydon is finally on the map! Croydon Advertiser: the Business Monthly 5 (April 2007), page 7.

TRIAL LONDON UNDERGROUND RAILWAY TUNNEL COOLING SYSTEM AT STOCKWELL STATION

Although tunnels for electric railways have modest ventilation requirements, unlike road tunnels where expensive provision has to be for the removal of carbon monoxide and other health-threatening components of the exhaust from internal combustion engines (which is of course why the Channel Tunnel was not made for road traffic), there is on the extensive London Underground System a need to keep the tunnels cool. The train motors, the electric escalators and lifts and lighting, and the passengers all generate heat which has to be dispersed to keep operatives and public comfortable.

Such is the intensity of usage of London Underground that the existing ventilation fans and shafts, and air movement induced by the trains themselves, are insufficient to cope with this problem.

A trial installation at Stockwell Station (Northern Line) is in prospect, whereby cold water from the chalk aquifer at about 13° C will be pumped from a borehole to a heat exchanger, where air from the tunnels will be cooled, thus warming the water. The cooled air will be returned to the tunnels and the water, now about 0.5° C warmer, will be returned (as required by Thames Water) to the aquifer via a second borehole at least 100m from the first.

A simpler version of a similar system is already in

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operation at Victoria Station where groundwater at about 16° C seeping into the cut-and-cover District and Circle Line tunnels is used in much the same way before being discharged to the local sewers.

If the Stockwell trial proves to be successful, similar installations may be provided at other LU sites.

SOURCE: ANON, 2007, Underground water to cool sweaty Tube travellers. New Civil Engineer, 31 May 2007, page 26.

PICCADILLY LINE TUBE TRAIN COOLING TRIALS, LONDON

A novel way to cool the trains and tunnels on the London Underground is to be trialled on the Piccadilly Line (London Heathrow Airport in west London to Cockfosters in the north-east) in 2008. Trains will be fitted with refrigeration units which will freeze tanks of water below passengers' seats to ice. When the trains enter the tunnelled sections of the line, where overheating is most problematic, the refrigeration units will be switched off. Warm air from the carriages will be blown across the blocks of melting ice under the seats and re-emerge cooled.

SOURCE: Ian SAMPLE, 2007, For a cooler journey by tube, just add ice under the seat. £ 150m push to take heat out of underground travel. Refrigeration system will be tested early next year. The Guardian, 5 June 2007, page 7.

WORK HAS COMMENCED ON THE SIX-MILE 400 kV ELECTRIC POWER CABLE TUNNEL, LONDON BOROUGH OF CROYDON

A tunnel-boring machine (TBM) has commenced work on a nine kilometre long tunnel, three metres in diameter, to conduct 400 kV electric power cables from a sub-station and shaft at Rowdown (London Borough of Bromley) to another at Beddington (London Borough of Sutton.) The tunnel will run below Rowdown Wood, King Henry's Drive (New Addington), Addington Court Golf Course, Gravel Hill and Coombe Road (the A212), the Croydon Flyover (on the A232), Wandle Park, and Purley Way (A23.) There are intermediate shafts at the Gravel Hill end of Kent Gate Way, and at Lloyd Park (close to the tram stop on Coombe Road.) The TBMs, working 22 hours a day, will drive eastwards and westwards from the Kent Gate Way shaft, where all tunnel spoil will be raised. Tunnelling is expected to be completed by 2008, with power cables installed and operational in 2011. A similar tunnel was driven for 20 kilometres from Elstree (Hertfordshire) to St. John's Wood (London) completed in 2005.

SOURCE: Hugo DANIEL, 2007, Bringing more power to the people. Six-mile tunnel up to 150 feet beneath the borough's surface will carry 400,000-volt cable to meet rising demand for electricity. Croydon Advertiser, 11 May 2007, 26 - 27.

THE BRUNEL ENGINE HOUSE MUSEUM (ROTHERHITHE, LONDON) AND THE RE-LAUNCHED TUNNEL CLUB

At a reception and dinner in November 2006, at and near the Brunel Engine House Museum (www.brunelenginhouse.org.uk), the centenary of Isambard Kingdom Brunel's birth and his part, as his father's assistant, in the building of the first Thames Tunnel was commemorated. The Brunel Engine House Museum is in the original building, a Scheduled Ancient Monument, alongside the south bank tunnel shaft which gave access to the tunnel and housed pumps to keep it free of water.

Dinner was served in the adjoining Mayflower public house (formerly the Spreadeagle & Crown), more or less vertically above the site of the banquet held in the then unfinished tunnel itself in 1827. Paul Hoyland, Chairman Elect of the British Tunnelling Society, unveiled a plaque and spoke of the debt modern tunnelling technology owes to the Brunels, father and son.

The world's 'first underwater banquet' was held on 10 November 1827 but, also commemorated on this occasion was another dinner (above ground) held on 25 April 1834 (Marc Isambard Brunel's birthday) when Fellows of the Royal Society launched the original Tunnel Club. The intention is that a newly re-formed Tunnel Club will dine again at the Mayflower in April or November each year.

The tunnel itself now forms a small part of the London Underground system, with trains running through it carrying some 14 million passengers annually between Rotherhithe and Wapping Stations, both of which are worthwhile visiting in their own rights as vantage points from which each end of the tunnel can be seen. The Thames Tunnel. conceived with wheeled horse-drawn road transport in mind but unfinished and used at first only by pedestrians, survives in 2007 as the oldest part of the oldest underground railway system in the world.

SOURCE: Robert HULSE, 2007, The Brunel Museum and the relaunched Tunnel Club. Greater London Industrial Archaeology Society Newsletter 228, page 4.

FORMER POST OFFICE TUNNEL AT BIRMINGHAM

A recent article in the Guardian notes a 1960s tunnel

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from Birmingham New Street Station to the 'Mailbox', Europe's largest postal sorting office. Mail was transferred by 'gas-powered wagons.' The sorting office moved to the outskirts of the city over 10 years ago, and the building is now on the market as an hotel and shops complex. The tunnel has been re-opened, presumably temporarily, in connection with an arts festival.

SOURCE: Maev KENNEDY, 2007, Sounding the lost post in tunnel art beneath station. The Guardian, 2 July 2007, page 11.

STEAM LOCOMOTIVE SMOKE EXHAUST SYSTEM PROPOSED FOR THE 1880s CHANNEL TUNNEL

Evidence has been reported for a scheme to accommodate smoke from steam locomotives to be used in the 1880s Channel Tunnel, had the bore been completed. Beyer Peacock locomotives, as supplied to the London Underground, were to have been used, each fitted with a 'smoke slide' to conduct smoke downwards, between the axles, for collection in continuous trunking (with valves) laid between the rails. This would have been exhausted via large fans at each end of the tunnel.

SOURCE: Bill CROSBIE-HILL, 2007, Brunel's atmospheric experiment - and an even crazier idea. Jl. Railway and Canal Historical Society 35(8)(198), 620 - 621.

BELLE ISLE SIGNAL BOX, MAIDEN LANE STATION, and the COPENHAGEN and GASWORKS TUNNELS, KING'S CROSS, LONDON

The lines northbound from King's Cross Station pass, first, through one or other of the three parallel Gasworks Tunnels, then past the sites of the first (temporary) King's Cross terminus (known as Maiden Lane) and of the former Belle Isle signal box, then under the North London Railway viaduct, and then through one or another of the three Copenhagen Tunnels.

The Great Northern Railway first reached Maiden Lane, via the bored 593 yards first Copenhagen Tunnel, in 1850, this temporary terminus opening on 7th August in that year. On 14th October 1852, the entirely cut-and-cover first Gasworks Tunnel (527 yards) and the permanent terminus having been completed, Maiden Lane was closed, and the King's Cross Station we know today opened for business.

Two further entirely bored tunnels, the same length as the first, were opened to the west (1877) and east (1886) of the first Copenhagen Tunnel. And likewise, two further tunnels, the same length as the first, were opened to the west (1892) and east (1878) of the first Copenhagen Tunnel of 1852. The two new tunnels in the latter case were partly cur-and-cover and partly bored.

Peter Kay's recently published paper explains, with historical photographs, the developments of line layouts and signalling in the area between the two sets of tunnels.

SOURCE: Peter KAY, 2007, The Great Northern main line in London: Belle Isle. London Railway Record 51, 182 - 197.

EMERGENCY EXERCISE IN PARK HILL TUNNELS, LONDON BOROUGH OF CROYDON

The London Borough of Croydon has altogether four railway tunnels. One, under Riddlesdown, is still in use by electric trains to and from Oxted and East Grinstead. The other three, all very short ones very close together, carried the former Woodside & South Croydon Railway (closed in 1983) under Park Hill, on the east side of the town. They are now used by the modern Croydon trams, so it is now possible (for the first time since the Kingsway tram tunnel was closed in central London) to travel underground on a tram in London again.

The Park Hill tunnels were used recently, on a Sunday morning, for an emergency exercise, in which two trams and 110 'passengers' (provided by the Casualties Union and the Metropolitan Police Volunteer Cadet Corps) were involved in collisions in them.

The three tunnels are, from south to north,

Coombe Lane tunnel	239 m	A bored tunnel with elliptical brick-lined arch profile
Park Hill tunnel	109 m	A cut-and-cover tunnel with semi-circular arch profile
Radcliffe tunnel	145 m	A bored tunnel with elliptical brick-lined arch profile

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The gaps between the tunnels are no more than rectangular-section light wells, each the width of the double-track tunnel and of the order of four meters long.

SOURCE: ANON, 2007, 20-20 tunnel vision in emergency exercise. Your Croydon 8, 12 - 14.

TUBE TRAINS AT FORMER ASHFORDBY COLLIERY, LEICESTERSHIRE

A short item in the [London] Metro in April stated that 'air-conditioned Tube trains for London Underground are to be tested at a former coal mine' on a '23km)14-mile) long rail test track at the former Ashfordby Mine at Melton Mowbray, Leicestershire,' possibly giving a misleading impression that tube trains would be running about deep underground at this location!

The Old Dalby test track in fact occupies part of the former passenger and freight line between Melton Mowbray and Nottingham (Midland), branching off northwards to the west of Melton Mowbray station. Possibly sidings at the closed colliery are also used in conjunction with the test track. Although the test track may possibly run through the 419 yards Ashfordby tunnel, that feature is presumably not of any great importance in connection with test-running the tube rolling stock, as it is the mechanical response of the carriages to the track which the focus of interest. And a nice long stretch of otherwise unused track means there is no need to fit test-running around public train services.

A photograph of a Pendolino train during testing at one of the portals of Ashfordby tunnel on the Old Dalby track appeared in the May edition of Modern Railways.

SOURCE: ANON, 2007, Old coal mine to test new Tubes. [London] Metro, 16 April 2007, page 2.

SOURCE: ANON, 2007, Pendolino lengthening - no early resolution? Modern Railways 64(704), 30 - 31 [Includes photograph captioned 'Flashback to testing phase - a Pendolino on the Ashfordby test track' - shews a train with overhead power supply at a tunnel portal (Ashfordby tunnel?) on the Old Dalby test track]

BRUNEL'S TUNNELS ON THE SOUTH DEVON RAILWAY

Cook's European International Railway Timetable includes a section on 'scenic lines' for those planning journeys in mainland Europe. One of the highly recommended British scenic routes is the Exeter to Newton Abbot line along the red sandstone cliffs, especially the eight kilometres between Dawlish Warren and Teignmouth, where the trains run along a sea wall and through five short tunnels through headlands. This is an especially spectacular ride during storms.

This stretch of line is regarded, by Peter Fookes in a recent article in Geology Today, as one of Isambard Kingdom Brunel's civil engineering masterpieces, although the author admits that the use of 'atmospheric' traction, abandoned after only two years of erratic running, was an expensive mechanical engineering mistake.

At Dawlish Warren the line runs over post-glacial sands (themselves subject to marine erosion) and along the foot of the red Permian sandstone and breccia cliffs, just above beach level. Differential marine erosion has created, along this faulted cliffline, a series of small bays and headlands. It is characterised by steep gradients and short-radius curves, and when first opened to traffic had six short tunnels through headlands, of which the southernmost at East Cliff (Teignmouth) was opened out in 1884. The remaining tunnels, in order southwards from Dawlish Warren, are Kennaway tunnel (209 yards), Coryton tunnel (224 yards), Phillot tunnel (55 yards), Clerk's tunnel (66 yards), and Parson's tunnel; (512 yards), inside which the track and the trains are of course protected from winter storms, when waves can crash over the exposed sections. The cliffs have suffered minor falls and occasionally larger landslides, most notably in 1852. It was, undoubtedly, an audacious route for a main line railway, and successfully built to Brunel's instructions in 1844 - 46, traffic commencing in May of the latter year.

Brunel had been appointed Chief Engineer by the Great Western Railway in March 1833, and the line had been extended from Bristol to Exeter by 1844. The Plymouth, Devonport and Exeter Railway Company (later renamed the South Devon Railway Company, and in due course a part of the GWR) was established in 1840. Brunel persuaded the Directors that the new line should be a single broad gauge (seven feet and a quarter of an inch) track, and worked on the 'atmospheric' principle. This called for a 375 mm diameter iron pipe along the centre of the track, and eight pumping stations to evacuate air from the pipe ahead of each train. A piston within the pipe connected with the underside of the rolling stock, there being a continuous slot along the top of the pipe, closed by a leather flap except where the connection passed. The train was, therefore, propelled by the pressure of air in the pipe to the rear of the piston pushing it (and the train) along. It didn't work very well! Brunel had estimated a saving of £ 207,000 by building only a single line. However, his vacuum pipe and

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pumping stations had cost £ 426,000 of which only £ 50,000 was recovered when in 1848 the 'atmospheric' materials were sold for scrap. The company then, of course, had to buy conventional steam locomotives to work the line. In the course of time, Brunel's broad gauge was abandoned throughout the Great Western Railway system, and the Dawlish Warren to Teignmouth line is now a double track standard gauge railway.

SOURCE: Peter G. FOOKES, 2007, Brunel's coastal railway. Geology Today 23(1), 24 - 29.

THE CAMDEN HORSE TUNNELS, LONDON

In 1854 - 56 a tunnel was provided below the railway tracks to link Camden Goods Yard with stables the other side, providing a safe route for horses used in the yard. Shortly afterwards a second such tunnel was provided, to facilitate the transfer of horses to and from Allsop's stables at the site of 42 Gloucester Avenue. There was also a connection from the towpath of the Regent's Canal. Up to 400 horses worked in the goods yard and sidings, moving goods and shunting waggons.

The eastern tunnel is Listed grade II and starts at Stables Market and leads to a large area of brick-arched basement storage under the forecourt of the Interchange Warehouse. It reaches ground level in Gilbey's Yard at 30 Oval Road, and is unique other than horse tunnels found on some canal towpaths.

Planning proposals at 30 Oval Road would mean the destruction of a staircase linking to the tunnel, and its blocking. Discussions between the developers, Camden Council, English Heritage, and the Camden Railway Heritage Trust continue.

A proposed Camden Railway Heritage Trail will pass the Primrose Hill tunnel east portals, the roundhouse, stables, Camden Lock, Interchange Warehouse, a stationary winding-engine house, and the complex of vaults, arches, and horse tunnels.

Graham Bird's report (of which this is a summary) is stated to have been derived from the Camden New Journal (11 January 2007, page 13) and the Newsletter of the Camden History Society (January 2007, page 3.)

SOURCE: Graham BIRD, 2007, Camden horse tunnels. Greater London Industrial Archaeology Society Newsletter 228, 5 - 6.

SOURCE: Graham BIRD, 2007, Camden horse tunnels. Industrial Heritage 32(3), 57 - 58.

LONDON UNDERGROUND GETS BIGGEST UPGRADE SINCE 1863

Trains operating four London Underground sub-surface lines will have new rolling-stock by 2015. 190 new trains have been ordered from Bombardier of Derby. Transport for London will be funding longer trains for the Circle, District (Edgware Road to Wimbledon), and Hammersmith & City lines (seven carriages replacing six) - with deliveries expected from 2010 - 2015.

SOURCE: ANON, 2007, London Underground gets biggest upgrade since 1963. Railondon 95, page 1 [Reproduced from Transport Briefing, 6th December 2006]

PROPOSED SEWER TUNNEL BELOW THE RIVER THAMES, LONDON

A new sewer tunnel from Hammersmith (west London) to Beckton (east London) is proposed, by-passing the present overloaded Victorian sewers, to take peak flow rainwater and sewage which at present, at times of maximum flow, discharges into the river. London's sewers take both foul water and rainwater runoff, and at times of high rainfall there is a risk of untreated contaminated water backing-up and flooding properties and streets. The new tunnel would ensure that the entire flow would be diverted to Beckton and treated. The 33 km long tunnel, at depths of up to 80 metres below the surface (well below existing tunnels), would have a diameter of seven metres, and be routed largely below the bed of the River Thames.

SOURCE; David ADAM, 2007, Tunnel costing £ 2bn to bail out London will push up water bills. The Guardian, 23 March 2007, page 15.

THE WHITRIGHILL TUNNEL, MERTOUN PARISH, BERWICKSHIRE

Whitrighill tunnel is some 0.8 metres high and runs for 1,250 metres under Whitrighill from Whitrig Bog (NT 621348) to Maidenhall (NT 620336.) Originally it had six air shafts along its course, up to 20 metres deep.

According to information at a nearby Scottish Wildlife Trust Reserve "In 1790 nearby Whitrig Bog was drained by Lord Polwarth by tunnelling .. using Napoleonic prisoners of war. The draining work revealed substantial amounts of clay within Whitrig and a tile works which is still visible was established at the west end in about 1801 and closed in about 1900."

SOURCE: ANON, 2007, Whitrighill Tunnel, Mertoun Parish, Berwickshire. Newsletter Northern Mine Research Society, May 2007, page 3.

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NEW TUNNEL AND SUB-SURFACE STATION ON NORTH-SOUTH LINE BELOW ANTWERP CENTRAL STATION, BELGIUM

Antwerpen Centraal station was built as a terminus, which through trains from Belgium to the Netherlands had to bypass. With the opening on 23 March 2007 of a new 3.8 km tunnel below the city, the station now has 14 platforms on three levels. The new line is a part of the upgraded High-Speed line to Amsterdam, on which work commenced in May 1998.

The city now has more convenient links on an east-west line on a route from Lille and Gent to Lier and Liege, and a north-south line linking Brussels and Mechelen with Roosendaal and Rotterdam in the Netherlands.

SOURCE: ANON, 2007, Antwerp low level opens. Modern Railways 64(704), page 68.

LÖTSCHBERG BASE RAIL TUNNEL (SWITZERLAND) OPENS FOR FREIGHT

The Berg- Lötschberg-Simplon Railway (BLS) began trial operations in the new Lötschberg base tunnel on 14 March 2007, and the first trial commercial freight trains ran through the tunnel from 17 March. It is expected to become a full part of Switzerland's operation railway network with effect from June 2007, with through passenger services between Switzerland and Italy commencing on 9 December. Rail journey times from Basel and Bern to Milan will be reduced by about an hour.

SOURCE: ANON, 2007, Lötschberg opens for freight. Modern Railways 64(705), page 61.

GOTTHARD BASE RAIL TUNNEL (SWITZERLAND) PROGRESS

The new railway base tunnel on the Gotthard route is due for completion in 2012. This is a larger and more complex undertaking than the Lötschberg tunnel, and will include a new passenger station within the tunnel, 800 metres below the mountain surface. More than 1,800 tonnes of explosives have been used to create the artificial cavern to hold the station, a railway junction, and operational equipment. Express lifts will link the station with the surface.

SOURCE: ANON, 2007, Gotthard progress. Modern Railways 64(705), page 61.

METRO TUNNELS AND ARCHAEOLOGY IN ROME, ITALY

A planned 'hi-tech driverless underground railway' intended to 'bring desperately needed transport links to the historic heart of Rome' has encountered 'a minefield of Roman remains' according to a recent report in The Guardian.

The new Line C is intended to pass below the city centre at a depth of 30 metres, with stations also deep underground. Although the tunnels and stations should be well below Rome's archaeological heritage, there is still the need to construct entrances from the surface. It has been suggested that the proposed Largo Torre Argentina station, near the Pantheon, may have to be delayed if not scrapped. Excavators encountered the corner of 'an Imperial Roman building.' Italian law requires the new line to avoid archaeologically important sites. Another problematic planned station on Line C could be Chiesa Nuova. Rome's existing Lines A and B skirt the heart of the city, in a loop of the river Tiber. But the planned 15-mile Line C is intended to link the Vatican with the Colosseum and the suburbs.

SOURCE: Tom KINGTON, 2007, Roman remains threaten Metro. The Guardian, 14 May 2007, page 22.

TUNNELLING PROPOSED BELOW GAUDI'S SAGRADA FAMILIA CHURCH, BARCELONA, SPAIN

The Spanish rail authority, ADIF, is building a 600 km high-speed rail line to connect Barcelona with Madrid, and proposes the shortest and straightest route below Barcelona in a 12m diameter tunnel. This is proposed to pass, in ground of poor and uneven quality, below the façade of the famous 22,500 tonne church of Sagrada Familia. This building, described as 'surrealist,' has been under construction for the last 125 years, and expected to take another 30 years to complete. Its architect was Antoni Gaudi, who died as a result of being run over by a tram in 1926. A campaign is under way to divert the line

SOURCE: Damian ARNOLD, 2007, Tunnel plans bring subsidence risk to Gaudi church, claims architect. New Civil Engineer, 3 May 2007, page 10.

TUNNEL FOR THE KREMLIN, MOSCOW, RUSSIA

Traffic congestion in Novy Arbat, a 1960s 8-lane main road in central Moscow, is to be relieved by the construction of a new 8-lane road tunnel. This is proposed to have one of the four lanes each way reserved for President Vladimir Putin and other Government officials. Critics object that this will have the effect of reducing provision for public traffic. The existing road is to be pedestrianised.

SOURCE; Luke HARDING, 2007, Kremlin chiefs get

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own lane in tunnel to beat Moscow jams. The Guardian, 17 March 2007, page 26.

TUNNELLING IN A REMOTE DESERT AREA IN EASTERN ICELAND

Iceland is self-sufficient in inexpensive hydro-electric power, and has also (not very successfully) exploited natural volcanic steam for power generation. As her surplus of electricity cannot be exported by any conventional means, it has been used for some years to run a very large aluminium smelter on the coast road between Keflavík International Airport and Reykjavík. This reduced imported bauxite to aluminium, ingots of which are then exported. Another smelter is now under construction near the small town at Rey_arfjör_ur on the remote east coast. This will import bauxite from Australia. Electricity is to be supplied by a very large new hydro-electric power station in the desert uplands further inland, at Kárahnjúker, where an elaborate series of tunnels for water to and from the underground turbine hall is being driven. Production of aluminium is expected to commence in April 2007, to the tune of 346,000 tonnes of the metal each year, more than a tonne for every man woman and child in the country.

SOURCE: Richard HOLLINGHAM, 2007, Environmentalists in uproar as Iceland pays the price for green energy push. The Independent, 21 March 2007, page 29.

PROPOSED RED SEA - DEAD SEA CANAL TO SERVE ISRAEL, JORDAN AND PALESTINE

Following the signing of an Israeli - Jordanian peace treaty in 1994, the two countries have been working on plans to link the Red Sea (with a salt concentration of 3%) with the Dead Sea (with a salt concentration of 33%) This would mean pumping water from near Aqaba to a height of 170 metres and then allowing it to flow the remainder of the 110 miles through a canal and tunnels to the Dead Sea, the lowest point on the earth's surface, some 397 metres below sea level. In its descent, the water would be used to generate electrical power to supply the pumps, and to power a desalination plant to augment water supplies to parts of Israel, Jordan, and the Palestinian territories.

The Dead Sea has been shrinking for at least the last 20 years, as a result of evaporation and of water abstraction and diversion from the River Jordan and six smaller rivers by Israel, Jordan and Syria. During this time its level has dropped by about 1 metre each year, and its surface area has shrunk by some 30%. Hotels built at the water's edge are now a bus ride away. It has been estimated that, at this rate, the sea may dry up completely within the next 50 years.

Environmentalists have voiced concerns about introducing far less saline water into the Dead Sea. The water forms an importance source of chemical raw materials for Israel's industry such as common salt (sodium chloride) as well as bromine, and salts of magnesium and potassium.

SOURCE: Ian BLACK, 2007, New boost for planned canal between Red Sea and Dead Sea. Firms commissioned to study feasibility of link. 25-year project would ease region's water shortage. The Guardian, 27 June 2007, page 26.

THE BERING STRAIT TUNNEL PROPOSAL - SIBERIA (RUSSIA) TO ALASKA (USA)

A tunnel under the Bering Strait, linking Russian and United States territories, was first proposed in 1890. The Strait is named after Vitus Bering [1681 - 1741], a Danish explorer serving in Peter the Great's navy, who discovered Alaska in 1741 but who was shipwrecked and died on the westernmost of the Aleutian Islands which, like the Strait, is named after him. The objectives of the expedition had included the determination of the boundary between Asia and North America. Alaska was declared to be a part of Russia, but was sold to the USA in 1867, and declared the 49th state in 1959. The Strait is 38 miles wide at its narrowest part, and links the Arctic and Pacific Oceans.

Planned by a French engineer, the project was approved in 1905 by Tsar Nicholas II, the last Russian emperor. Planning was suspended as a result of World War I.

The tunnel question has been raised again in the Russian Academy of Sciences. An estimated cost of over £ 32bn has been reported. Tunnelling under the sea would possibly be the easier part of the project, with the structure surfacing at two points on intermediate islands. The route under the strait would be from the Ciukotka peninsula in Siberia. The length would be about 85 km, about twice that of the Channel Tunnel. The links at either end would be more challenging - mountainous, remote, and enjoying a very severe climate. It is over a thousand miles, on the Russian side, from the nearest road. And Alaska has no direct rail links with the remainder of the USA. Some 3,700 miles of railway would have to be built to link existing lines at Yakutsk (Siberia) and Fort Nelson (British Columbia.) Traffic is forecast to be 100 million tonnes per annum, comparable with that through the Panama Canal.
SOURCE: ANON, 2007, Tunnel under Bering Straits? Today's Railways Europe, June 2007, page 42.

RAF Portreath - A History

RAF Portreath was opened as an RAF Fighter Command Sector Station and Overseas Air Dispatch Unit (OADU) on 7th March 1941 as part of 10 Group whose headquarters was at RAF Box at Corsham. Prior to this, the Sector Station had been at St. Eval. An unusual feature of the station was four tarmac runways, although only the main runway was suitable for anything other than a single seat fighter. Twin blast pens and four blister hangars were spread out around the perimeter track and at a later date four T2 hangars were also built on the technical site. 263 Squadron was the first to arrive at Portreath, providing defence for the Western Approaches with the Westland Whirlwind Mk 1 fighter; they were soon replaced by Spitfires as Portreath took an active role as a fighter station.

On May 11th 1941 a Fighter Sector Operations Centre was opened at Tehidy Barton Farm, two miles south west of the airfield; on the opening the station took added responsibility for the satellite airfields at St. Mary's (Scilly Isles), Perranporth and Predannack. In early May, Bristol Blenheim light bombers arrived at Portreath and their airfield was used as an advanced base for raids on France, although the main runway was only just long enough for a heavily loaded Blenheim.

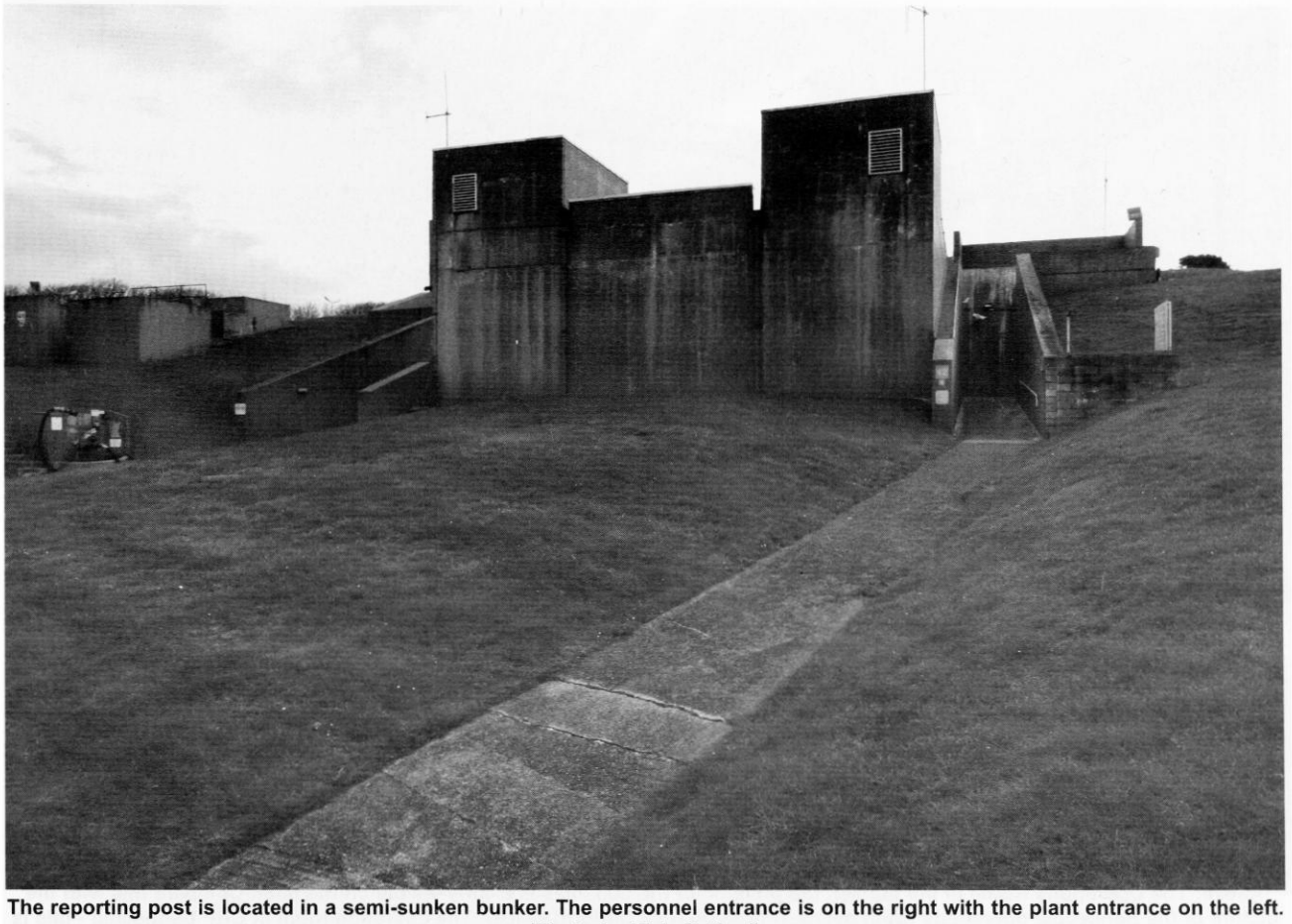
Early in the war, RAF Kemble became host to a unit that prepared aircraft for service overseas, mainly the Middle and Far East. No. 1 Overseas Aircraft Preparation Unit (OAPU) was established at Kemble to carry out the task of modifying aircraft to operate in these regions. After modification aircraft were flown to Portreath from whence they were despatched to their destination; Portreath's geographical position making it an ideal departure point for North Africa.

In October 1941, a detachment of the Honeybourne based Ferry Training Unit was established at Portreath to organise 'ferry flights' for crews that had been trained for overseas flying duties. The influx of crews during this period stretched the available hutted accommodation to its limit and a colony of tents was established on the hillside to provide additional crew quarters. During October 1942 the airfield was selected to take part in 'Operation Cackle' which involved the supply of aircraft, aircrew and supplies for the USAAF 12th Airforce to take part in 'Operation Torch' which was the Anglo-American invasion of French North Africa.

During the first half of 1943 Portreath was almost entirely committed to ferry operations. In July 1943 a new Sector Operations Centre was opened at Treganea Hill overlooking Portreath, one mile south west of the airfield, however it was little concerned with operations at Portreath which now mainly consisted of coastal strike and anti-fighter operations over the Bay of Biscay. Portreath remained busy during the build up to D-Day when 248 Squadron equipped with Mosquito VI's mounted five separate missions.

After D-Day, sorties over the Bay of Biscay were few and far between and following the last sortie on September 7th 1944 the coastal squadrons were transferred to Banff in Scotland and the station went quickly into decline just leaving the Air Sea Rescue Squadrons and 1 Overseas Air Despatch Unit. The ASR squadrons left in February 1945. The last flying unit left Portreath in May 1945. The station was transferred to to 44 Group (Ferry Service) of Transport Command during that month and 200 aircraft were delivered overseas and a Transport Command Briefing School was established on the airfield but this was short lived. An overland route was now available to the Middle and Far East and with Portreath unable to handle transatlantic traffic, movements rapidly declined. The OADU was transferred to No. 2 OADU at RAF St. Mawgan in September 1945; the Briefing School left on 8th October and Air Traffic Control ceased on the following day.

RAF Portreath - A History



The reporting post is located in a semi-sunken bunker. The personnel entrance is on the right with the plant entrance on the left. (Photo by Nick Catford)

In December 1945 the station was reduced to Care and Maintenance transferring to Technical Training Command in May 1946 for use by 7 (Polish) Resettlement Unit. When this unit moved out the airfield was abandoned.

RAF Portreath becomes CDE Nancekuke

The United Kingdom's investigations into the military possibilities of organophosphorous compounds received an enormous post-war impetus from the stockpile of captured German nerve agent and research documents concerning Tabun and Sarin. Sarin was quickly identified as the most suitable agent for the UK services and by 1950 development was sufficiently advanced for limited production to begin. It was clear that the Chemical Defence Establishment at Porton Down was unsuitable for this work due to its proximity to large centres of population and industry. A new, remote location was therefore sought and the abandoned coastal airfield at Portreath in the sparsely populated area of the Cornish peninsula was considered ideal.

The site was taken over by the Ministry of Supply and renamed CDE Nancekuke. Added security was introduced with a new 9' high wire mesh perimeter fence and the closing of all approach roads. At that time there was virtually no public knowledge of the work and the non-scientific workers employed to build the plant were not told of its intended use. It was intended that the huge site, extending to several hundred acres, should initially be home to a small scale Sarin production plant under-taking process research work, but plans were already being prepared to build a vast, fully automated Sarin production and weapon-filling plant there.

CDE Nancekuke began operating as a small-scale chemical agent production and research facility in 1951. CDE Nancekuke operated 3 sites: North Site, Central Site and South Site. A pilot production facility was built on North Site to support the research, development and production of a nerve agent known as Sarin (GB) and Nancekuke became the prime centre in the UK for production and storage. Production at this plant commenced in 1954 and continued until 1956. During this period it produced sufficient Sarin (GB) to prove the process and to meet the requirements for assessment trials and the testing of defensive equipment under development at Porton Down. Subsequently, international tension relaxed to

RAF Portreath - A History

Above: The Operations Room in the bunker, the position of the consoles is clearly visible on the floor. Compare this with the picture of the Benbecula operations room below. (Photo by Nick Catford) Below: The operation room at CRP Benbecula - this is identical to the operations room at Portreath with universal consoles. The consoles at Portreath were removed when the station was downgraded to a remote radar head.

RAF Portreath - A History

The air conditioning plant room in the bunker (Photo by Nick Catford)

the point where it was not judged necessary to proceed with a production plant and production ceased in 1956 by which time a stockpile of some 20 tons had been accumulated.

CDE Nancekuke from 1956

From then on, work at Nancekuke concentrated on the small-scale production of chemicals and agents to support the UK's defensive research programme which was being directed from Porton Down. Between 1956 and the late 1970s, CDE Nancekuke was used for the production of riot control agents such as CS gas which was manufactured on an industrial scale from about 1960. The CS plant produced the agent on a batch process at the rate of 30 kg per day with some 33-35 tons being manufactured in total. Nancekuke was increasingly involved with the development of medical countermeasures, training aids, and the development of charcoal cloth for use in protective Nuclear, Biological, and Chemical (NBC) suits used by the British Forces.

Chemical Closure and Dispersal

In 1976, a defence review recommended the transfer of remaining work to CDE Porton Down, and the decision to begin decommissioning CDE Nancekuke was taken. A team of international inspectors oversaw the decommissioning process and the site is still open to inspection by members of the Organisation for the Prohibition of Chemical Weapons (OPCW).

All remaining stocks of chemical agents were destroyed or transferred to Porton Down between 1976 and 1978. Some chemicals were either neutralized on site or returned to the commercial chemical industry, but a considerable volume was buried on site along with debris from dismantled plant and buildings. At the time, this was considered to be an environmentally acceptable procedure. Material was dumped in five clearly defined and widely separated locations within the boundary of the Nancekuke site. One site was an old quarry some 40 or 50 feet in depth, this was filled with rubble and steelwork from the demolished factory along with similar material from surviving Second World War airfield buildings that had been reused for chemical purposes. Close to the cliff edge four specially excavated pits each 2 metres in depth were excavated and filled with waste chemicals from the factory. Nearby, the ground level of a shallow valley leading to the cliff edge was raised by about 20 feet by the deposition of building rubble, waste chemicals and quantities of asbestos from demolished

RAF Portreath - A History

One of 19 unique WW2 air raid shelters built on the airfield (Photo by Nick Catford)

buildings. More worryingly, two deep, long-abandoned tin mine shafts within the factory perimeter were used to dump surplus equipment from the Sutton Oak research establishment at the time that its function was transferred to Nancekuke.

The problem with landfill is that what goes under the ground inevitably comes out in the water. Currently, in the United Kingdom, the problems of serious ground and water contamination from buried military waste are having to be addressed. The only safe solution is to recover these contaminants and treat them by chemical or physical means to ensure that their future environmental impact will be neutral. To comply with current legislation the site is now being cleaned up under the Nancekuke Remediation Project This process has just begun at the time of writing and is expected to be completed by the end of the decade. The CDE moved out in 1978 and the station reverted to the Ministry of Defence as a radar station.

Cold War Radar

The Linesman radar system had become fully operational in 1974. In 1971 it was proposed that command of the United Kingdom Air Defence Ground Environment (UKADGE) was maintained centrally at two sites, West Drayton and Strike Command (HQ) at High Wycombe with control allocated to four control and reporting centres (CRC) at Buchan, Bishopscourt, Boulmer and Neatishead. The sites were able to exchange data by digital links with any of the sites able to take over from one of the others in an emergency. This new network was planned to give full coverage of the approaches to the UK and was fully integrated into the wider NATO air defence system.

Once implemented the system was somewhat different incorporating three elements; fixed Sector Operations Centres, Control and Reporting Centres, and mobile radars. The UK air defence region was divided between North and South controlled from SOC's at Buchan (north of Aberdeen) and Neatishead (Norfolk) with Ash acting as a training unit and capable of taking over from either one of the SOC's in the event of an emergency. Below the SOC's in the hierarchy of control were the Control and Reporting Centres or Posts (CRC's were underground and CRP's were on the surface) with display consoles identical to those at the SOC's. Their task was to create a local air picture of flying activity which was then relayed to the SOC's. After fighter interceptors had been scrambled, control

RAF Portreath - A History

The radome over the Type 101 radar (Photo by Nick Catford)

and reporting centres might assume the tactical control of the fighters. A CRC was established at Boulmer with CRP's at Portreath, Faeroe Islands, Saxa Vord (Shetlands), Benbecula (Hebrides), Bishopscourt (Northern Ireland), Staxton Wold (Yorkshire) and Ty Croes (North Wales).

The first plans for a CRP in the West Country covering the East Atlantic approaches were drawn up in 1974. The proposed site was at Burrington adjoining the Civil Aviation Authority (CAA) radar site. Burrington was quickly dropped due to perceived problems with interference and coverage in favour of a joint RAF/CAA site on the disused Winkleigh airfield in Devon. Here a Type 84 radar was proposed for the RAF and an SCR264 radar for the CAA. Before work on the site could be started the Type 84 was deleted from the national plan and the CAA station was never built.

With the closure of CDE Nancekuke in 1978 the old airfield at Portreath was selected as the best site with staff accommodated at RAF St. Mawgan. Because of the delays in selecting a suitable site it was vital that the new radar station was quickly established. No. 1 Air Control Centre arrived from Wattisham in July 1979 with the new station coming on line early in 1980 with a Type 93 mobile radar and refurbished WW2 buildings and portacabins. The station was formerly reopened as RAF Portreath on 1st October 1980. A new semi-sunken CRP bunker was finally built c.1988 and extended in c.1992

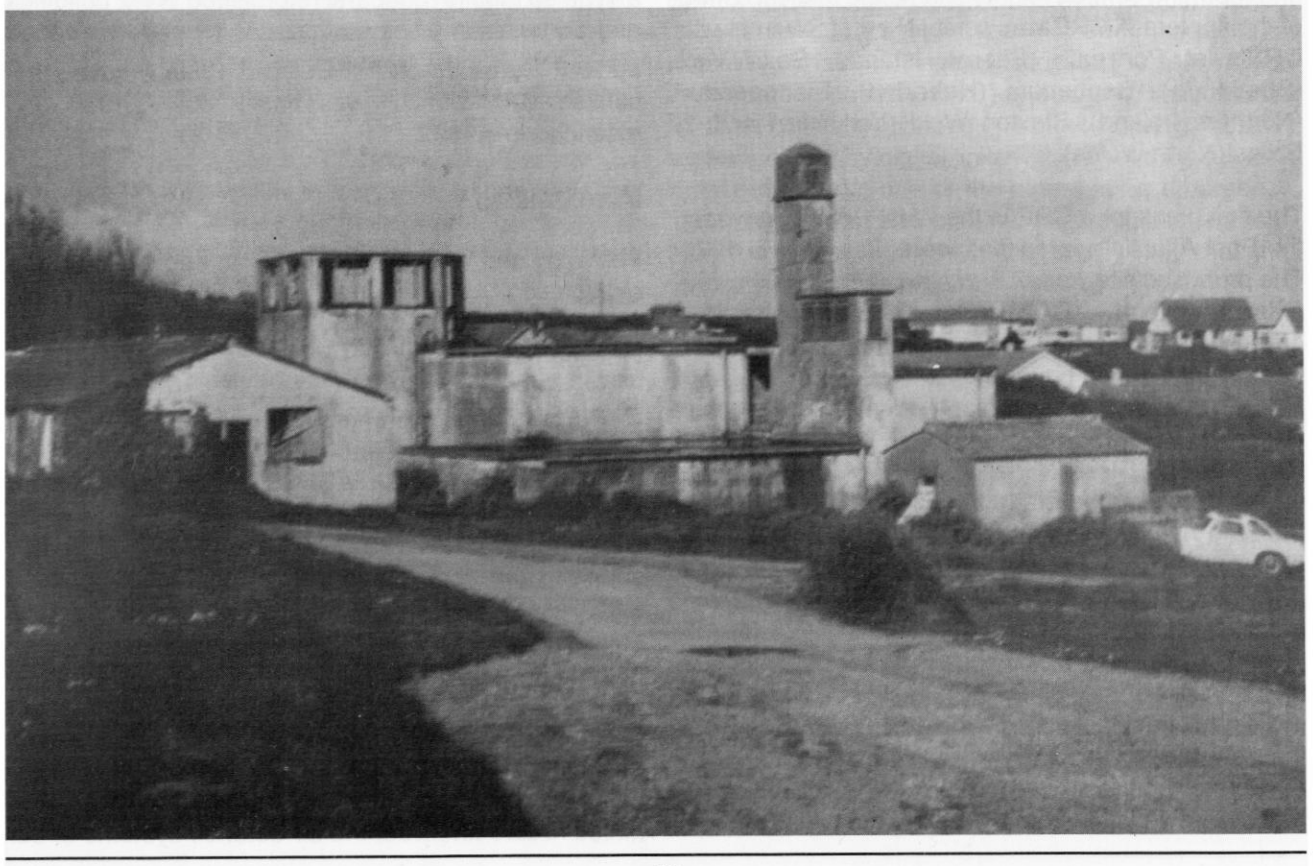
Downgrading

Following the end of the cold war and the reduced expectation of an air attack on the UK RAF Portreath was downgraded to a remote radar head parented by RAF St. Mawgan.

RAF Portreath is still operational as a Reporting Post with a remote radar head within the UK Surveillance and Control System (UK ASACS) which provides up to date information on air activity required to defend the UK and NATO. The UK ASACS is a highly sophisticated computer-based system which gathers and disseminates information on all aircraft flying in and around the UK Air Defence Region - this is known as the Recognized Air Picture (RAP). The information within the RAP is used by the Air Defence Commander when deciding whether to investigate or perhaps even destroy an aircraft flying in an area without permission. Information is fed into the RAP from the RAF's ground-based radars and from the air defence systems of our

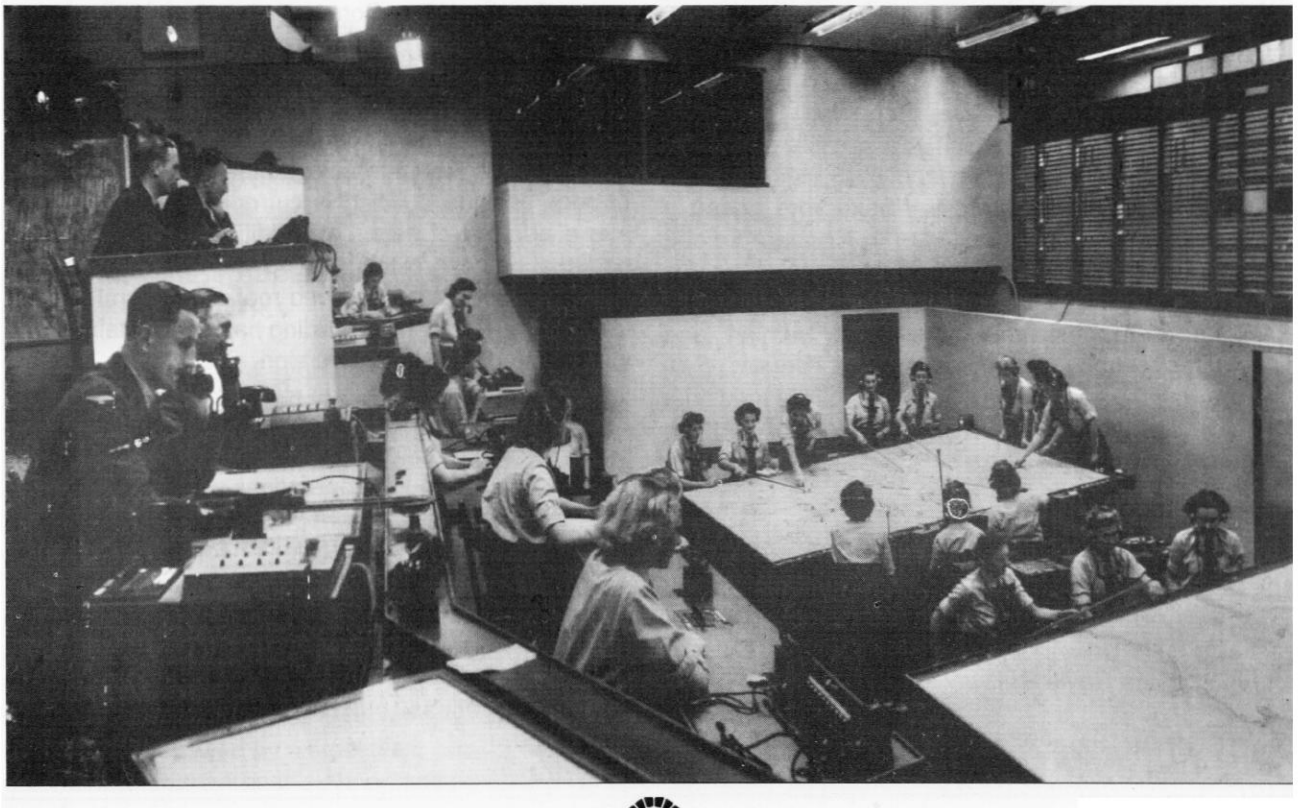
RAF Portreath - A History

Above: The Portreath Sector Operations Centre in March 2007 (Photo by Nick Catford) Below: The derelict Portreath SOC in 1977 before conversion into the 'Ops Room Inn' (Photo by Ian Collett)



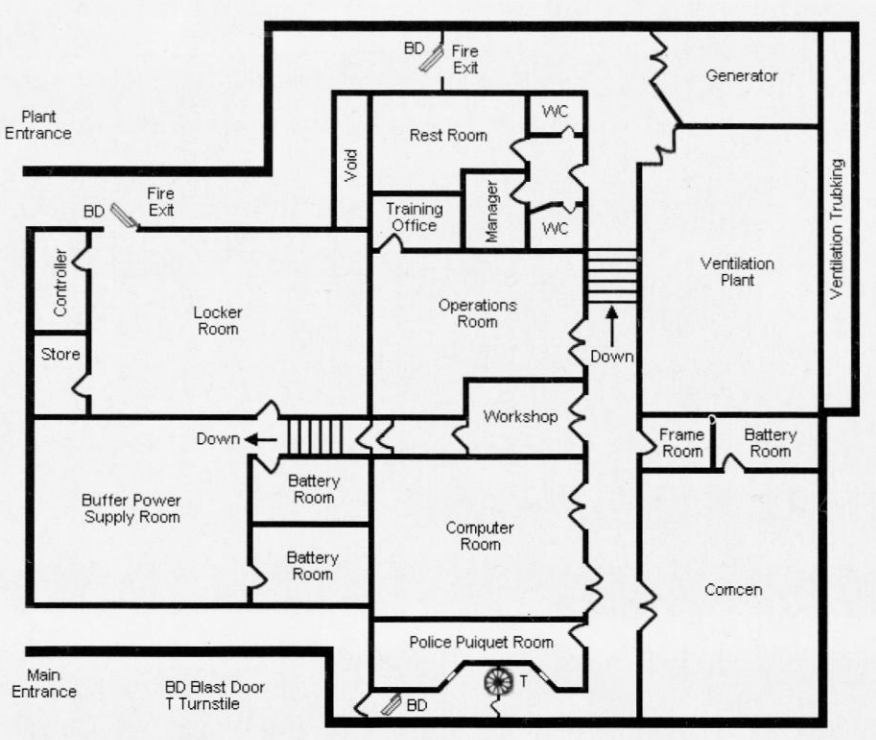
RAF Portreath - A History

Above: The operations room in the Portreath SOC in March 2007 - note the intercept cabin is still in place. (Photo by Nick Catford) Below: The Operations Room at the WW2 Middle Wallop Sector Operations Centre. This was identical to the SOC at Portreath. Note the intercept cabin overlooking the operations well. Compare this to the recent picture of the Portreath SOC where the cabin is still in place.



RAF Portreath - A History

neighbouring NATO partners. However, the UK ASACS can also receive information via digital data-links from other ground, air or sea-based units including No 1 Air Control Centre, which as a part of the UK's Rapid Reaction Force holds a high state of readiness to deploy world-wide in support of crisis. The United Kingdom Air Operations Centre (UKCAOC) is situated within Headquarters Strike Command at RAF High Wycombe.



RAF Portreath Reporting Post - Plan by Nick Catford

The UK ASACS has two operational Control and Reporting Centres (CRC's) based at RAF Scampton in Lincolnshire and at RAF Boulmer in Northumberland. The CRC's receive and process information provided round-the-clock by military and civilian radars to produce the RAP. In addition to this radar data, the CRC's also exchange information using digital data-links with neighbouring NATO partners, AEW aircraft and ships. However, the production of the RAP is only one part of the CRC's duties, the second being the control of aircraft. The CRC's are supported by three Reporting Posts (RP's) across the UK. In addition to those found at the CRC's, the locations of these RP's reflects the locations of the RAF's main Air Defence radars that feed information into the UK ASACS. These Reporting Posts are located at: RP Portreath which is a satellite of RAF St Mawgan, RAF Staxton Wold and RAF Benbecula in the Hebrides. A Reporting Post at Saxa Vord closed in 2005 and another at Bishopscourt in Northern Ireland closed in the late 1990's

RAF Portreath also now acts as a training and development base for the Cornwall County Fire Brigade incorporating the Commercial & Industrial Training Section which offers a range of training courses for commerce and industry.

RAF Portreath Today

The Sector Operations still stands on Treganea Hill close to a new residential development and on the east side of the prominent Victorian incline that brought a branch of the Hayle Railway into Portreath.

The SOC saw little use during WW2 opening in July 1943 to replace the earlier SOC at Tehidy Barton Farm. It closed in late 1944 and was replaced by the Exeter SOC at Poltimore Park (this later became the administration block for the ROC Group HQ. The site was considered in 1961/2 as a civil defence control centre for the West Cornwall area but the cost was prohibitive and the building remained empty until 1977 when it was bought by its present owner who turned the operations room into a licensed leisure complex known as the 'Ops Room Inn' incorporating a dance hall. The Ops Room Inn closed in 1996 due to lack of patrons and the building is currently being converted into a number of flats. An additional floor has been added at one end of the building and the entire building has been given a new hipped roof. An integral lookout tower at the back of the building has been retained and incorporated into the conversion.

At the time of writing the operations room has been partitioned but is still recognisable with an office with a window overlooking the operations well still in situ. An adjacent room still retains the engine beds for a standby generator. The WT station for the SOC is also still extant on a private cliff ledge to the rear of Battery House above Portreath. This building can only be accessed from a steep overgrown path in the rear garden of Battery House and consists of a small rendered roofless building still within a fenced compound.

RAF Portreath - A History

The sarin manufacturing facility in 1976. The shell filling plant is to the right of the chimney

On the airfield one runway remains active and this is used occasionally by Royal Air Force and Royal Navy helicopters. Most of the WW2 buildings were demolished following the closure of CDE Nancekuke but some original buildings survive. These include the combined mess, squash court, ambulance garage (behind the new Station Headquarters) and a number of refurbished huts near the main gate which have now been put to unspecified use. The aircraft machine gun ammunition magazine also still stands on the airfield close to the present transmitter block.

18 covered air raid shelters are also still extant (there were originally 19 but one has been demolished). These are of a unique design, internally similar to the Stanton shelter generally found at airfields with a walk in entrance down steps at either end leading to a single room about 25 feet in length. Unusually at Portreath the shelters have 12 external ventilation stacks in two lines along each side of the roof. These shelters are all in good dry condition and some are even lit. One of these shelters has been incorporated into a 'Cornish Hedge'. (a stone faced earth bank often forming a field boundary in Cornwall).

The present radar is a Type 101 now housed beneath a Kevlar radome for added protection against the weather. The bunker is set into the side of a small valley on the south side of the airfield and is not visible from outside the perimeter fence. The bunker is semi sunken with an open front and earth cover to the rear with protruding intake and exhaust ventilation shafts.

Both the main personnel entrance and the plant entrance/emergency exit are located at the front of the bunker. The personnel entrance is at the end of a right angled open walkway and consists of a wooden door immediately followed by a steel blast door. This opens onto a lobby with a turnstile ahead and a police picquet room to the left. Once through the turnstile there is a left turn into the main east – west spine corridor.

The Comcen is on the right with its data transmitters relaying the data from the radar to the CRC's at Boulmer and Scampton. Beyond this is the BT frame room and then steps down to the lower plant and domestic areas. The air conditioning plant room is next on the right and is still fully functioning although at a reduced capacity. The next room houses the Atlanta standby generator and control cabinets. The generator is still tested once a month. From here the corridor turns to the left through a large blast door which also acts as an emergency exit. Beyond this there is a dog-legged open walkway back to the front of the bunker.

Returning to the main spine corridor, the first room on the left is the police guard room and beyond it the computer room which is still in use. Beyond this is a workshop. At the back of the workshop is a corridor into the 1992 extension to the bunker which incorporates a number of rooms including the buffer power supply room which still retains its power smoothing machinery.

Beyond the workshop the next room on the left is the former operations room. This originally housed two rows of universal display consoles but these were removed when the station was downgraded to a remote radar head with only the controller's desk, computer and electrical switch gear still remaining at one end of the room. Back in the main corridor the domestic rooms are at the bottom of the stairs on the left comprising male and female toilets, rest room and the site manager's office.

From Nick Catford

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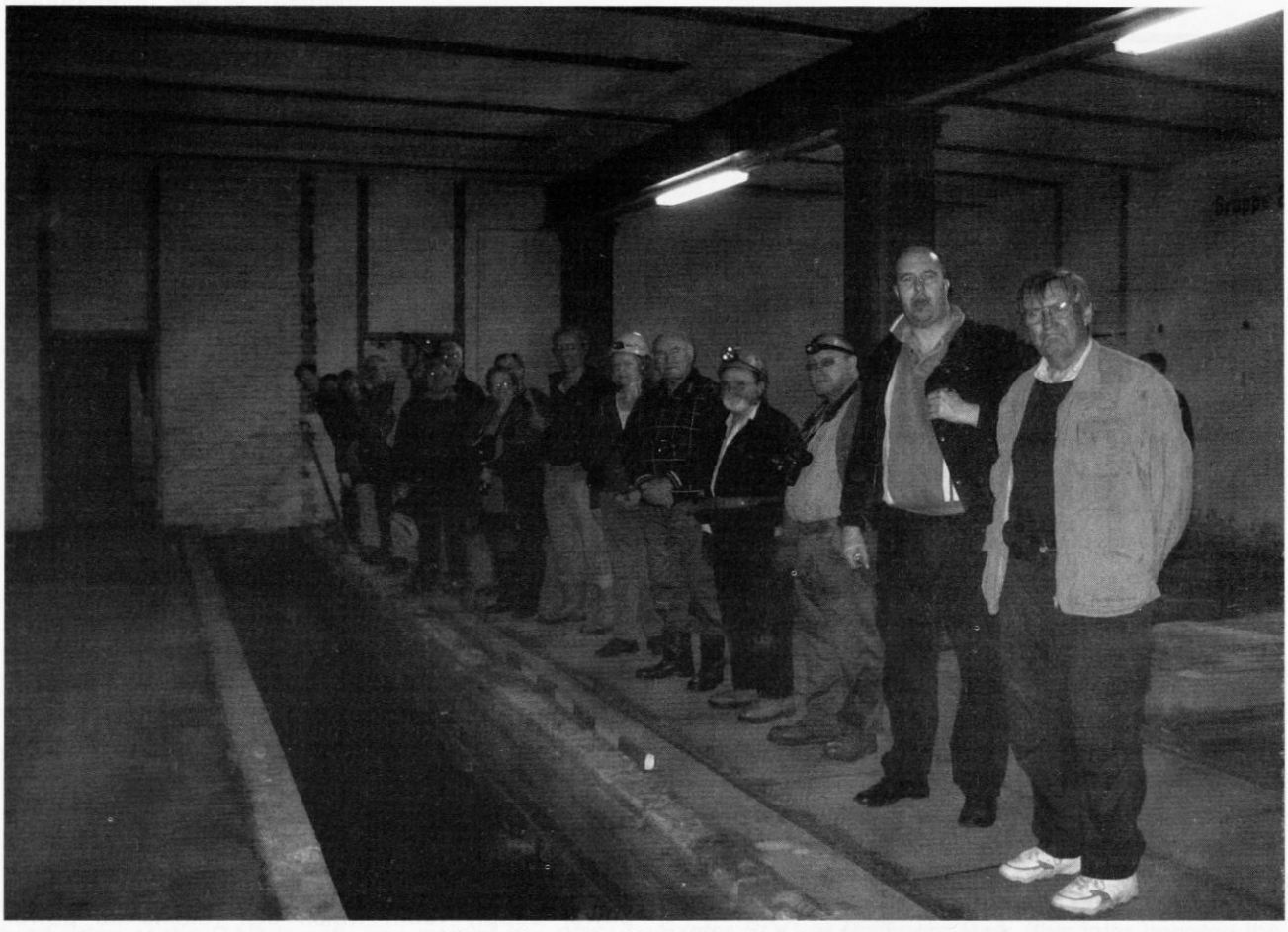
Bob Jenner, Keith Ward & Ian Collett

Berlin Study Weekend 2007



Waiting for a train - Photo Jane MacGregor

Last year a small group of Sub Britters went to Berlin and were shown some of the city's underground bunkers by the interest group Berliner Unterwelten. Knowing that many others would want to see this and with the support of the Committee, Robin Ware (with some assistance from his unofficial private secretary who can almost speak German) arranged a spring Study Weekend which drew thirty-five attendees.

Base camp was the AO Hostel Hotel, which had small but clean rooms, an excellent buffet breakfast, bar and very reasonably priced Internet room- what more could we want? It was handily located for the main railway and U-Bahn, which was great news as we got around solely by public transport. It was also very close to the route of the Wall: the street-lighting, matching that of Fuchsbau and other bunkers, being a give-away that we were in the old East. Berliners use the expression "die Mauer in Kopf", the Wall in the Head, and that also seems to afflict Sub Britters with several people looking around the area for traces of the border. Robin and I arrived the day before to finalise arrangements, and were joined by a small group of early arrivals for a pleasant evening talking bunkers with our Berliner Unterwelten host Sascha Keil in a steak house off Karl Marx Allee.

On Day 1 the remaining arrivals beat the weather to the hostel by five minutes. I was photographing the nearby East Side Gallery at the time, and managed to avoid being struck by lightning but not a drenching. After briefing and dishing out the day-tickets for the U-Bahn we were off already. A U-Bahn ride and pleasant walk from Potsdamer Platz took us down to the Tiergarten, one of the many open spaces in the city, adjacent to the Brandenburg Gate and Reichstag.

This area saw very dramatic changes in the twentieth century, and was a frontier area from the division of Berlin onwards. However, in the 1930s it was a central area for the administration of the Third Reich, and indeed the site of the Fuhrerbunker is not far away.

Adolf Hitler had great plans for developing Berlin: the Germania plans. On his drawing board was a colossal Congress Hall, which was to have a huge glass dome and would dominate the area. It is said that the dome would have been so enormous that the building could have created its own weather inside. The main road, Unter den Linden, was to be diverted underground here and would run in very large underpasses. Two insignificant-looking manhole covers in the trees are now almost the only traces of the planned

Berlin Study Weekend 2007

Sub Brit go Paddling under Berlin -Photo Jane MacGregor

development. With the group divided into two parts, one for those who could understand German and those who couldn't, we took a manhole each and climbed down into the darkness.

The scale of these tunnels, even in their incomplete state, is very impressive. They have a rectangular cross-section and are made from well-shuttered, reinforced concrete in excellent condition. One section is flooded to a depth of around two feet. We walked off through the water and through a double doorway to the next section which had been earmarked for use as a factory during World War II making small electrical components- one of the old lights is still in situ on the ceiling. The second section is dry except for a small amount of water by the factory emergency exit- which is a rebar ladder protruding from the wall, with the entry now backfilled. These tunnels used to exit to surface and were used to test drivers' reactions as their eyes adjusted to the dark and different types of lighting. Underground road tunnels at the time were uncommon and it was not known how best to light them. Apart from the manhole covers the only traces of these sweeping entrances to the underpasses are old curved kerbstones which are set into the pavement for, now, no apparent reason.

Next on the list was the Berliner Unterwelten HQ. They use an old WWII shelter built around the U-Bahn station on Gesundbrunner Strasse- an extensive bunker which is now mostly open to the public, with the private areas being used as offices by BU. The bunker still has its fluorescent radium paint on the walls, which will glow bright green if you fire a camera flash at them. The original painted signs such as "Rauchen Verboten" and "Raum fur __ Personen" are still on the walls. Again, the walls are reinforced concrete in superb condition. Many rooms have been more or less restored with benches and beds to illustrate what the conditions in shelter would be like, and some other rooms also house displays on the history of the Second World War, the Third Reich defensive structures and the Fuhrerbunker. There are displays of wartime artifacts such as Nazi uniforms, old shells, ration cards and inert weapons- including some of the infamous British incendiary bombs. There are also photographs of other underground sites in Berlin including many now not open to the public. The bunker is built around the U-Bahn and the rumbling of trains passing underneath adds to the atmosphere. This bunker is well worth a look.

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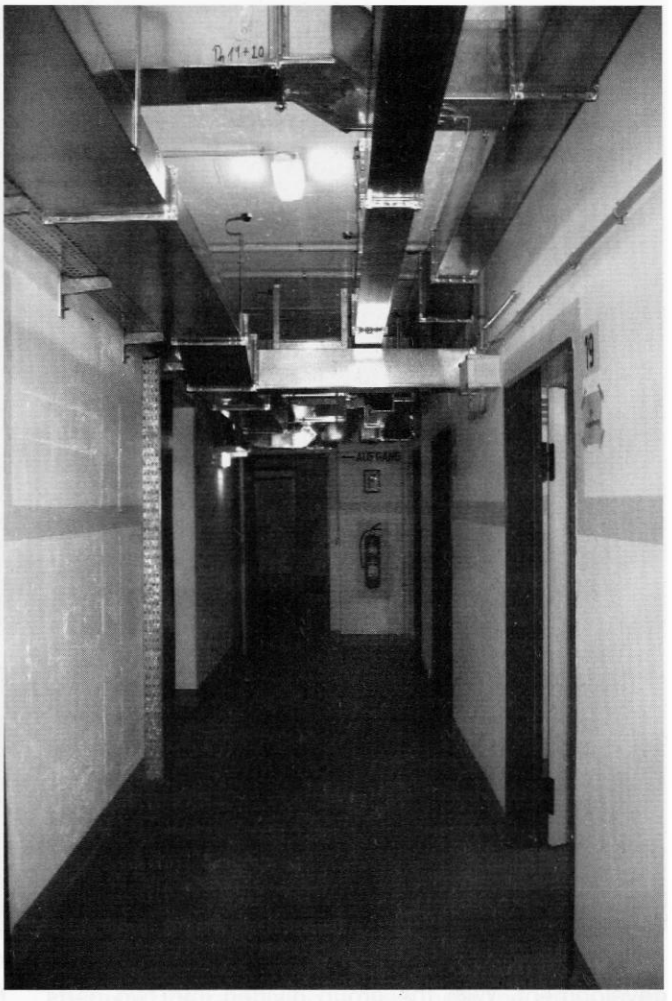
Two interlinked bunkers near Gesundbrunner were the first port of call on Day 2. The first, Blockplatz, was another WW2 bunker integrated into a U-Bahn station, which was then converted into nuclear hardened facilities at a later date. The air is drawn in through a room which is filled from floor to ceiling with sand- instead of using particulate filters, the air is simply drawn through by a pump in order to decontaminate and cool it. Andrew Smith was volunteered to demonstrate the hand pump in revenge for all the people he has asked to help him start the Paddock generators- it is extremely difficult owing to the sheer volume of sand that the air travels through. The pump is also connected to a working dynamo which powers the emergency lighting. An aperture into the sand room is screened off by composite concrete-lead bricks. This bunker has no cooking facilities or large-scale water or sanitary facilities, so if you sat out the blast here you would get good protection factor but very little else. The bunker houses displays on the Berlin Airlift (including old ration supplies), the Berlin Wall, and the Stasi's efforts to patrol the wall. One room is dedicated to die Mauer unter der Erde (the Underground Wall), featuring the grilled-off sewers, photographs of the ghost stations on the U-Bahn, and similar. Part of the bunker is let to a theatre group who use it for their plays, one of which is about Chernobyl and the room they use is lit with ultraviolet light and has NBC suits hanging on the wall.



The Wannsee Hospital Bunker - Photo Jane MacGregor

Pankstrasse U-Bahn station does not just house a "proper" nuclear shelter on an amazing scale; the whole station is itself a nuclear shelter. There are massive blast doors on the running tunnels either side of the platform. Trains would be run in both sides during the period of tension and there they would stay, forming seating and accommodation space for some of the hundreds of inhabitants. Behind a set of doors which look like nothing more than the entrance to a dry riser, stairs lead up to the accommodation areas: dormitories of three-tier bunks, a medical room, sanitation and a proper, large-scale kitchen. Connected to it is the decontamination area, with a large shower room opening into the clean area. The generators are housed in a room beside the running tracks; this is off-limits to visitors for obvious reasons but their location was pointed out to us. This bunker is still in a state of readiness and is one of several; a certain percentage of the civilian population was automatically catered for- such a contrast to the advice given to us in the UK should it ever have come to that!

We next enjoyed a train journey out to Wannsee, the large lake adjoining Potsdam, to see a hospital bunker in the grounds of a medical centre. This building was originally a training centre for the Luftwaffe, and was frequently visited by one Hermann Goring. A massive blockhouse bunker, four storeys in height, was built in the grounds. Following the division of Berlin, the site fell into the Allied-controlled area and had a communications mast on top, a slightly unusual Cold War connection. This was made ready as an emergency hospital for Cold War use, but at reunification all the medical equipment was given as humanitarian aid to the former Soviet Union- a nice touch. The manholes in the lower floor lead to a dry concrete area. Sumps? Service area? No, according to our guide: once in lockdown under fall-out conditions you need somewhere to dispose of clinical waste, body parts and possibly the odd dead casualty or two. You don't want to go outside, so that was why there is a large void under the floor with airtight covers- and, at stand-to, containers of lime would be supplied. The bunker can be made ready in forty-eight hours, is very clean, and in full working order. There are two operating rooms, a large kitchen, fully equipped plant rooms, and the stairs are edged in luminous paint. We were asked to extinguish our lights at the top and then walked down the staircase, lit only by the glowing paint- a very spectacular sight.

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We then had a tour of the large house nearby, which was the scene of the Wannsee Conference where the Final Solution was discussed and drafted up in the space of 90 minutes- the building is now a memorial exhibition and is an interesting, if sobering, visit.
Sunday's visits encompassed the Cold War and World War II. A short walk took us to Dresdner Strasse, where there was a small cluster of sites. The first was a quick look at the frontage of some nearby buildings where the route of the Berlin Wall is marked in the road by cobblestones. One of these buildings is the site of one of many underground tunnels constructed by those desperate to escape to West Berlin. Some people were successful, but eventually the conspirators were infiltrated by the Stasi and ambushed during an escape, when the Stasi fired on those in the tunnel, causing at least one fatality.

Nearby is an old U-Bahn station dating from around 1900, but construction was interrupted throughout the inter-war years- it was almost finished by the time the Second World War broke out. Part of its running tunnel was converted into an air-raid shelter and is now a fantastic bunker, but unrecognisable as ever having been a part of the railway. This is flooded to around nine inches with very clear water, but has suffered remarkably little damage as there is almost no wood or organic material to allow fungus to take hold as has happened at Paddock. The floor is made from good-quality tiling, probably slate, and the painted signage has not peeled away. Ventilation ducts are still extant in the ceiling and the rusting remains of generators and air-circulating equipment remain in place. As the station fell below the route of the Berlin Wall, at one end there is a brick wall with concrete behind it. This was installed by the East German authorities, as the Berlin Wall extended below ground as well, with cable tunnels, sewers and railway tunnels all either blocked completely or fitted with alarmed grilles.

On the opposite side from the Berlin Wall, the incomplete U-Bahn station is a delight. The platforms are complete and have beautiful supporting pillars, which are iron girders clad in highly polished Swedish granite. The tracks have never been installed, but the walls opposite the platform have recesses in for posters or maps (nowadays it would be adverts). Post-war the station was used as a power transformer station and there is still stencilling on the walls above where the electricity cabinets would have been. In a room at one end the old cables are still there, long since cut, with the bitumen packing now gradually flowing down the walls.

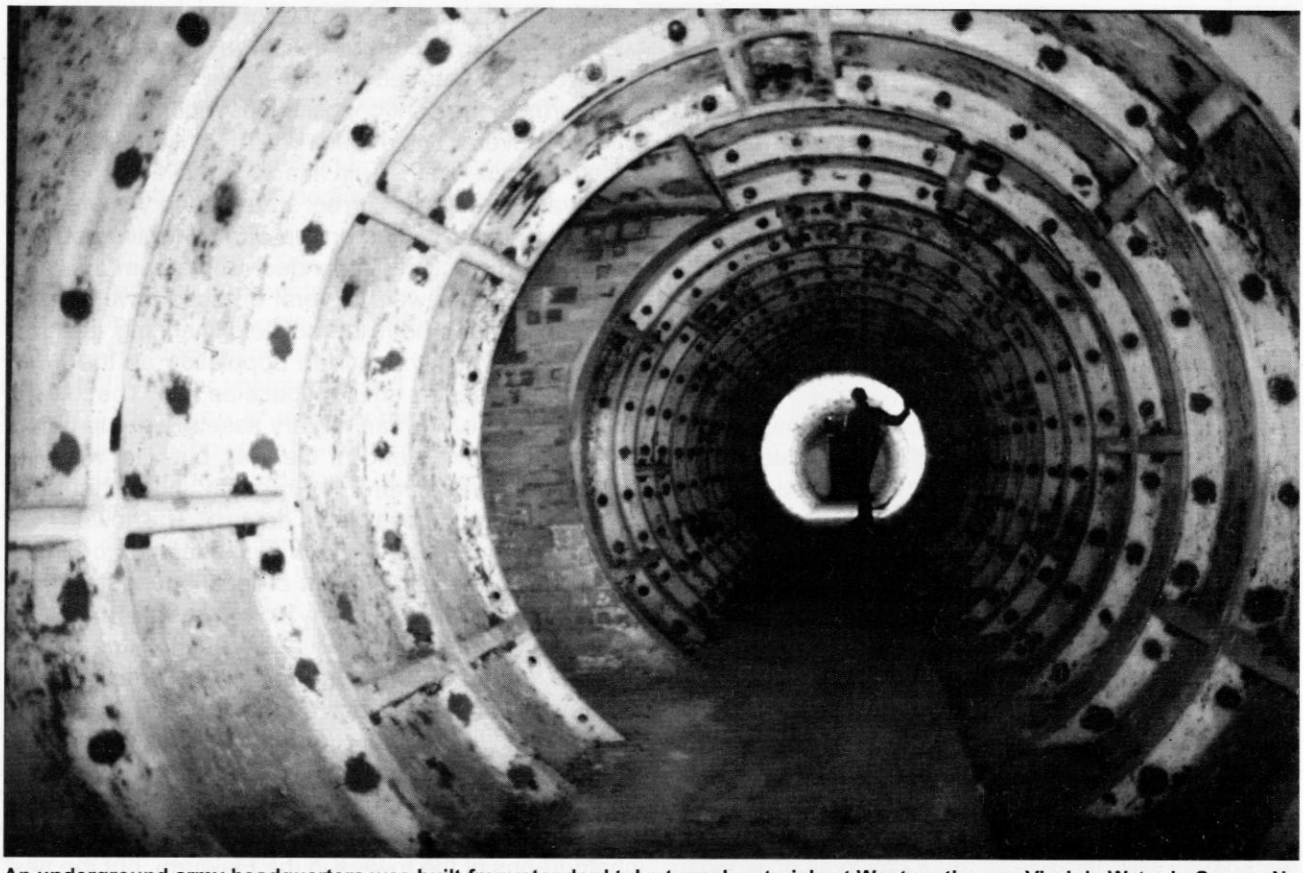
Walking to the nearby running U-Bahn station, the road was being dug up for new cabling- and below the cobbled line denoting the route of the Wall, the trench was divided by a clearly visible large concrete partition. The weekend rounded off with a visit to the flak tower (Flakturm) in the park opposite Gesundbrunner. This is one of several enormous WWII structures built to defend Berlin against air attack, is seven storeys in height and even in its current state is a very impressive building. It is positioned on top of a hill which appears natural, but is actually mounded rubble from the ruins of the war. There were several of these towers in the city, and housed both the soldiers manning the anti-aircraft guns and the civilian population as the lower levels were used as shelter space as well. The towers, like most of the German military assets, were to be put beyond use at the end of the war, but- like many of these structures- were so robustly built that they proved almost impossible to destroy. The tower near the Zoologischer Garten took four attempts to blow it up, much to the amusement of local youngsters who daubed "Made in Germany" on the wall after two completely ineffectual blastings. By the time of the fourth attempt the increasingly embarrassed occupying forces did not announce that they were about to have another go, with the result that the surrounding neighbourhood lost the few windows they had left, and a flying piece of concrete landed in the zoo, killing a hippopotamus. There are good photographs of the towers in the Flakturm, but the best part of the tour is where you are led along the top of the inside- it is full of rubble, and the shattered concrete and rebar forms a very dramatic sight. On an earlier trip to Berlin in 2006, I was lucky enough to be able to visit the lower levels of the tower with Berliner Unterwelten. The brick-lined service tunnels at the bottom are in excellent condition and, as at Gesundbrunner Strasse, there are painted signs for the shelter occupants in places. Some of the rubble has been identified as coming from the ruins of Berlin Castle, and the recognizable carved stones are displayed in the lower levels.

None of this would have been possible without the assistance of Berliner Unterwelten and especially Sascha Keil. The group made us extremely welcome and gave us a weekend to remember, packed with wonderful sites, humour and interest. Their hospitality and friendship was second to none. And of course, very grateful thanks to Robin Ware and, behind him, the Sub Brit Committee for yet another great study weekend.

Many of the above sites are closed to the public, but regular tours run of Gesundbrunner Strasse, Pankstrasse and Blockplatz, and the Flakturm (safe upper levels only). Details can be found on the website www.berliner-unterwelten.de

Jane MacGregor

London's Secret Tubes-the sequel



An underground army headquarters was built from standard tube tunnel materials at Wentworth, near Virginia Water in Surrey. No pictures have been discovered of the facilities in use but this photograph shows the appearance of the central tunnel during the early 1980s. [Roger Morgan]

Thanks to 5,000 of people like you who bought a copy the first print run of London's Secret Tubes has now been sold. My co-author Tony Beard and I thank you very much-and so does our publisher, who initially had grave doubts that a book on tunnels without trains could ever sell.

And even those tubes are not so secret any more, readers asked for a second edition and more secrets revealed. The first part of this was easy enough and I am pleased to say that the second edition is at the printers now for publication in October or November, in good time for Christmas. You'll be able to find it on the UK Amazon website and the publisher's own website. Whether you buy the new edition or not is something that I shall leave up to you but there is some useful new and augmented content to read.

There is always a limit to how much you can put in a book, at least in commercial terms, and unfortunately some very interesting material had to be left out of the second edition, simply for lack of space. Rather than waste it, though, I would like to share it with you here. The rest of this article is devoted to this material, starting with an update on the Bethnal Green tube station tragedy. Also included are three fascinating photos for which room could not be found in the book.

Bethnal Green disaster

The accident, in which 173 men, women and children died as they were descending the steps of the station entrance to seek shelter, too place on Wednesday 3rd March 1943. Although an official inquiry was held in the same month, immediately after the accident, the summary of its findings was not released until January 1945. Its proceedings have never been made public, however, and under the provisions of the Freedom of Information Act of 2000 Robin Woolven successfully applied to read the witness statements, which he has generously made available. The vivid eyewitness statements make extremely uncomfortable reading, not just for the grisly details of conditions in the shelter after the accident but also the appalling light it focused on some sections of humanity.

Mrs B- had a 2 1/2 -year-old baby boy in her arms and was with her sister and her mother. "There were men crawling over our heads, yes some police officers were there. I was just bruised. There were torches flashing, they were not police officers because someone called out over our heads and the baby was free … I had my hand on the baby and said, 'Will you please take the baby?' and he said, 'Every man for himself at a time like

London's Secret Tubes-the sequel

this'. That shows that he could not have been a policeman or anyone with any sense because he would have taken the baby from me."

Equally disturbing, however, is the strong criticism of police handling of the disaster made immediately after Mr Dunne had completed his report. Herbert Morrison in particular felt the report "was not hard on police, if anything a bit gentle. Bethnal Green police were wrong in not tightening up after the [previous air] raid." Affrighted by this, the government clearly had no wish for public morale to be undermined by criticism of the police. This may well have been the overriding reason for keeping this information secret so long.

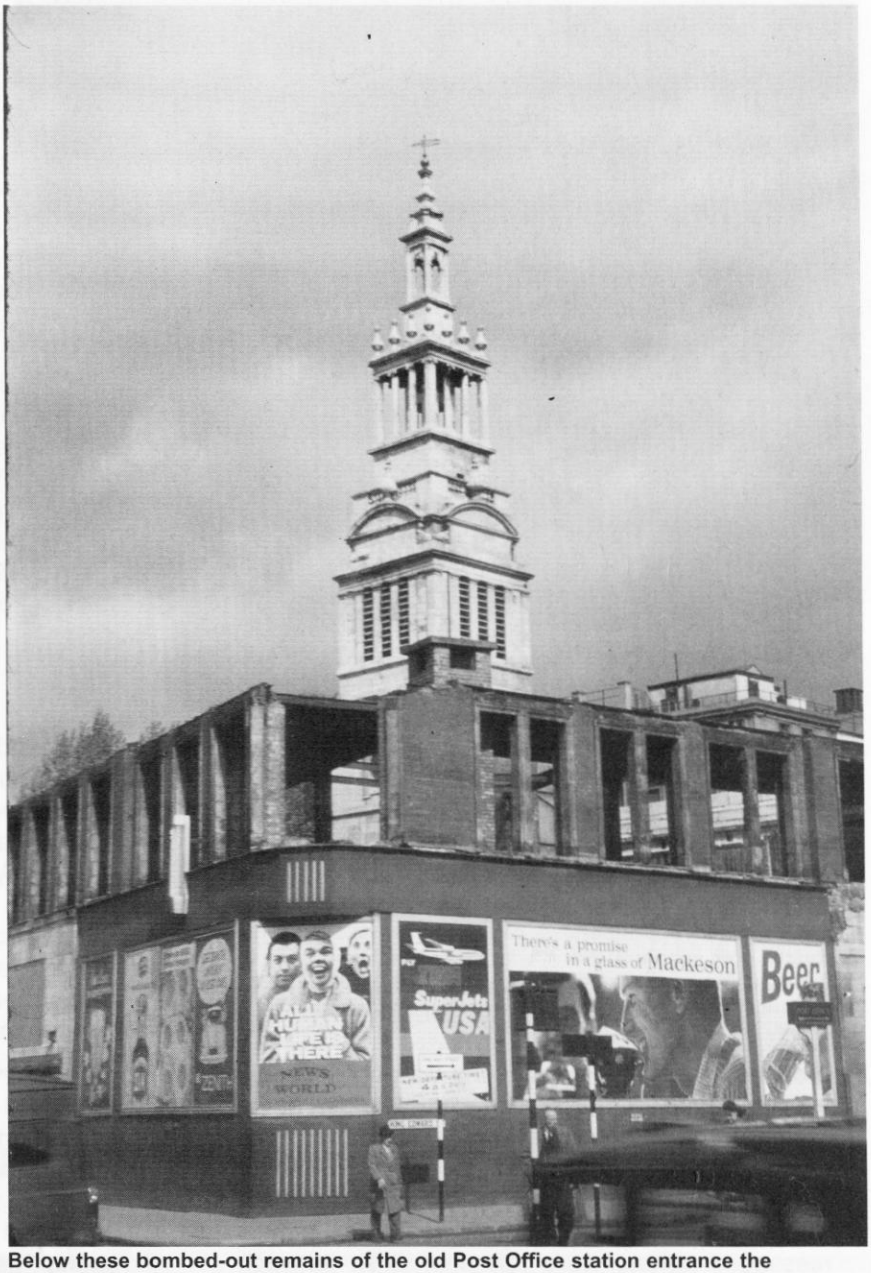
More on The Mystery Of The Door

Some valuable first-hand feedback was received about the 'Mystery Of The Door', the cable chamber built underneath a private house at 12 Hamilton Road, Ealing.

Roger Morgan, who inspected the house, states the cellar was tiny and primitive, measuring 15 x 3 feet (lying just below the hall). It had a bare earth floor, bare joists, and bare brickwork; in fact it looked as if it had never been used for anything. The back room on the ground floor showed a plethora of old telephone junction boxes on the window frames, but there was nothing striking, he adds.

Tony Clarke, whose grandfather, mother and aunt all worked for Cable & Wireless Ltd, living in North Ealing. He states:

During World War Two the girls would pass 12 Hamilton Road on the way to the station. My mother remembers commenting to my grandfather how odd it was that there was always a policeman outside, but though he knew what was going on there, he never commented. It was a time of Don't Ask, Don't Tell.



Below these bombed-out remains of the old Post Office station entrance the apparatus rooms of the wartime electricity control room remained in use until 1957. Four years later the ventilation tower was still visible behind the crumbling façade at the junction of Newgate Street and King Edward Street. [Indiana University Archive]

One July night in 1944, a V1 crossed the river and hit the second floor of Electra House on the Embankment, with two staff members killed by rubble crashing into the underground shelter. By 04.10, four hundred night staff were back at work in the debris under generator power. This disturbance went unnoticed by overseas terminals, but the Moorgate office and landlines suffered violent disruption on several occasions in the Blitz, bringing 12 Hamilton Road into use.

With war looming, it had been planned to convert a remote country house into a standby cable and wireless station, linking London with Porthcurno and the Atlantic. In August 1939, an

London's Secret Tubes-the sequel

Although post-war plans for a new Colonial Office opposite Westminster Abbey were abandoned, this did not halt the construction of a massive concrete blockhouse here at a lower level. At ground level people saw no clue of what was going on below behind the grey hoarding. The site lay fallow until the Queen Elizabeth II International Conference Centre occupied this location in 1986. The Morris Dancers in the foreground were the focus of this photograph taken on 13th May 1961. [Indiana University Archive]

ordinary red-brick villa in Ealing was chosen as it was logical that the disruption would happen at the London end. Camouflage was discussed, but seemed too ridiculous, so the house was just sand-bagged and strengthened internally (though not made air-raid proof). When required, critical messages abroad were run after dusk between Moorgate and Ealing by two tin-hatted couriers driving a small car. This is another story in itself.

At the end of the war, with four brothers returning from war, my mother's family (Burke) moved to the vacant 12 Hamilton Road. It was known that the house had been owned by the company, but apart from an abundance of sand bags around the cellar and an odd layout in the scullery, there was nothing unusual. They don't remember any new plasterwork in the cellar, but it could have been a strengthened cupboard for the landline connections, sealed in before the war in case of invasion. However, my eldest uncle, Terence Burke, does remember finding the end of a 64-core cable sticking out of a flower bed in the back garden and some switchgear on tables in the scullery but apart from the sand bags, nothing of particular note in the cellar.

Interestingly, Cable & Wireless was not the only cable company to have its wartime standby facilities in Ealing. Research in the Public Record Office indicates that Western Union was also located somewhere in Ealing, whilst the Commercial Cable Company was based in Osterley, the French (PQ) Telegraph Company in Southall and the Great Northern Telegraph Company a little further away in Northwood (Middx.).

GPO cable tunnels

The decision to protect important Post Office telephone cables by laying them in London Transport tube tunnels was taken early on and a list dated 26th July 1939 shows the following works already completed:

1. Whitehall to Colindale exchange [in Northern Line tunnels as far as Golders Green].
2. NATional exchange [City of London] to Stamford Hill [in Piccadilly Line tunnels as far as Manor House].
3. Whitehall to Waterloo [via Trafalgar Square station and Bakerloo Line].
4. Brompton Road to Holborn [via Piccadilly Line].
5. Whitehall to Dollis Hill [route unclear, possibly along Post Office Railway as far as Paddington].

These remaining works were stated to be 'recently authorised and it will be some weeks before they are available':

6. Shepherds Bush to Trafalgar Square [via Central and Bakerloo Lines].
7. Waterloo to TIDeway [possibly via Bakerloo Line tunnel as far as Elephant & Castle; TIDeway exchange served Deptford].
8. Moorgate to Bank [via Northern Line].
9. Bank to Ilford [via Central Line and new tunnels between Liverpool Street and Mile End].
10. Bank to Trafalgar Square [via Waterloo & City and Bakerloo Lines].

London's Secret Tubes-the sequel

11. Trafalgar Square to LIBerty [via Bakerloo Line to Waterloo, then Northern Line to South Wimbledon; LIBerty exchange served parts of Wimbledon].

After the war plans were made for dedicated cable tubes along a number of new routes that included tunnels reaching south from WATerloo exchange to Kennington and south-east to New Cross plus an ambitious east-west link from Paddington and Bayswater to Bethnal Green, with spurs to Museum Tandem and Bishopsgate exchanges. These were all rejected in 1952; the high level of the water table made the tunnel to New Cross problematic but shortage of funds was the chief reason for cancelling these schemes. At some time, however, at least two connections were made between GPO cable tunnels and the tubes of the London underground railways. Examples shown on plans include link tunnels located 645ft south of Regent's Park on the Bakerloo Line and between Liverpool Street and Mile End on the Central Line.

Other updates

The BBC's wartime Stronghold bunker is being demolished currently and two colour photos of the works can be found on Roger Beckwith's superb website about Broadcasting House (see Weblinks below). If you are familiar with After The Battle magazine you will know they do an excellent job examining aspects of Word War II, contrasting period photographs with ones taken of the same locations today. They have agreed to print the chapter on the Plessey tunnel factory at Ilford, with new 'Now' photos to go with the 'Then' pictures in chapter 12. No idea when or if this will appear!

Finally, did we get anything wrong in the first edition? Well yes. A few dates were wrong, one picture was missing entirely and one photo was printed twice on different pages. Corrections have been made in the new version. Was there anything hopelessly wrong in the first edition? No, thankfully not. And have we made any significant discoveries since the first edition appeared? Yes, at least one that cannot be mentioned because it is still operational.

From Andrew Emmerson

WEBLINKS

Amazon UK
www.amazon.co.uk

Capital Publishing
http://www.capitaltransport.com/NEW/Pages/LondonsSecretTubes.htm

The Broadcasting House extension that never was and the Stronghold
www.btinternet.com/~roger.beckwith/bh/misc/extension.htm

Further updates and corrections
http://www.subbrit.org.uk/LST/ (Note: /LST, not /lst)

Mines Miscellany - A Series of Mine Articles

The West Yorkshire fireclay industry

In the 1980 recession and collapse of the UK Steel industry, the demand for refractory products was much reduced, as was the demand for fireclay - an essential part of the process. By 1983 all but one of the UK's fireclay mines had closed, with fireclay instead being open-casted or imported from Poland.

The one quite amazing survivor was the Shibden Dale fireclay mine in Halifax. Although the mine opened in 1970, it quite remarkably employed a plateway, one of the earliest forms of railway. This was similar to the Surrey Iron Railway, although the gauge was narrower at one foot six inches. Hand pushed tubs were moved along the 'L 'shaped plates by hand and the clay was then tipped into lorry skips.

The special fireclay was much in demand when visited in 1994, indeed a new adit had been recently opened. The current status of the site is unknown but it was still active in 2001.

One of the customers of Shibden was T W Knowles Clay Pipeworks in Brighouse Road, Elland. Over the years the works established in the 1920s had operated 4 mines, the last of which opened in late 1970s. Instead of the traditional tramway, a building site type mini skip was used to bring out the clay from the adit.

Their last mine closed in 1983 - the recession and cost cutting meant it was cheaper to import fireclay The works is a remarkable survival with round kilns and traces of the various mines still apparent.

Mines Miscellany - A Series of Mine Articles

T W Knowles Works - Photo Keith Ward

T W Knowles is as far as I know the last refractory works left in West Yorkshire, having survived longer than many of the large works. The hills above Elland were once littered with fireclay mines.

British Coal Bentley Training Centre

One aspect of the coal industry that has often been overlooked is "where do they train the underground locomotive drivers?".

The NCB originally had a locomotive driver training facility in each region. As the industry retracted they were reduced to about 3 by 1992 when I visited the Yorkshire area facility at Bentley Colliery, Doncaster. The test track circuit there included an incline up a spoil heap; the track was greased and the new driver had to control the train on the downward gradient as if it was a runaway! It very amusing to watch.

By 1992, Bentley was one of the few locations where underground locos operated on the surface. The training centre had opened in the late 60s in the then South Yorkshire area and closed about 1994 when Bentley Colliery itself closed. All evidence of colliery and training centre were totally cleared with landscaped spoil heaps now being the only evidence of the once thriving industry.

Denby Grange combined mine - British Coal's 'great white elephant'

In the early 1980s, plans were formulated to link all the pits in the Barnsley area and build one new drift to extract all the production. This was a trend in British Coal (BC) to merge mines creating one single output location.

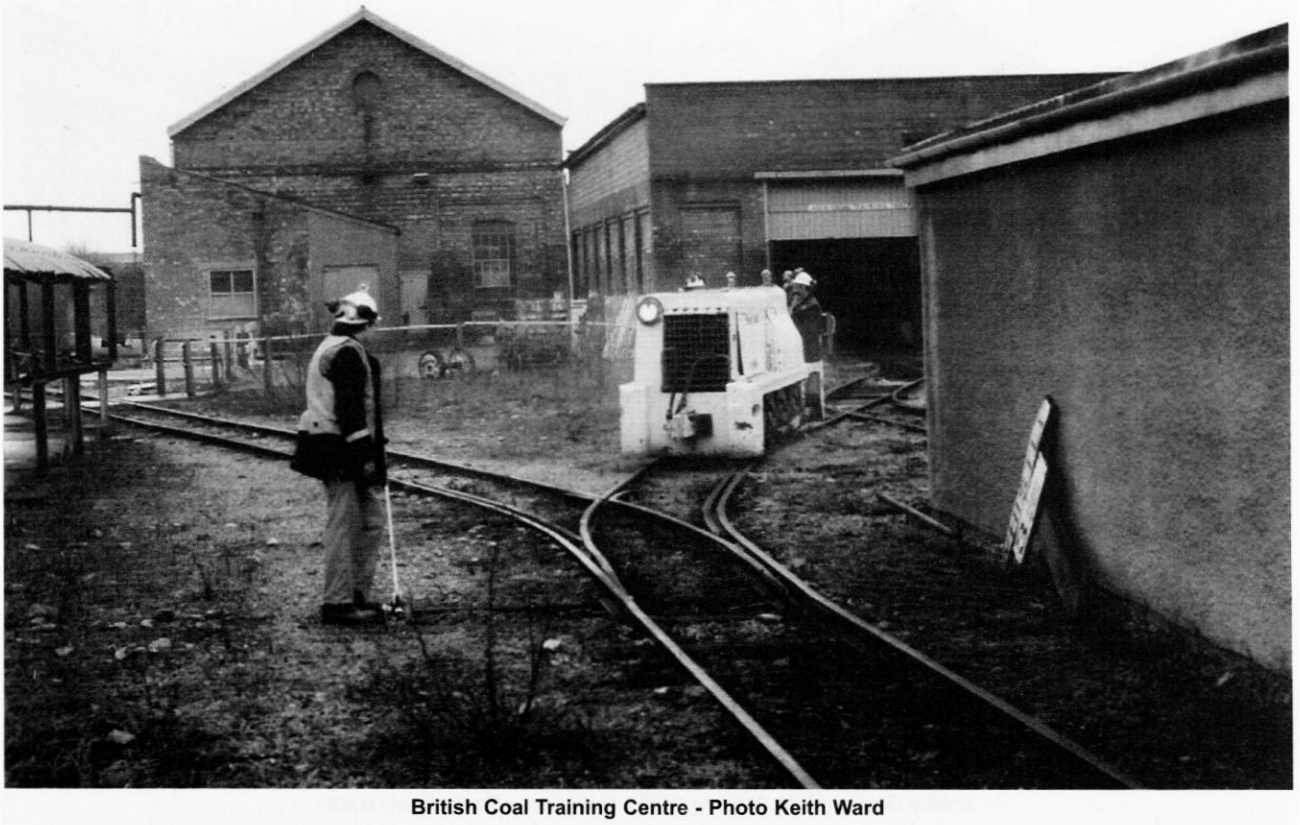
The ambitious scheme resulted in the building of a new drift at Woolley (to the North of Barnsley) with a new coal preparation plant and rail loading facilities that became a landmark from the adjoining M1 Motorway.

Redbrook Colliery in Barnsley was re-opened as a materials and manriding shaft. Barnsley Main and Denby Grange received new buildings for their roles of man/material shafts and a new materials drift was opened south of Wakefield.

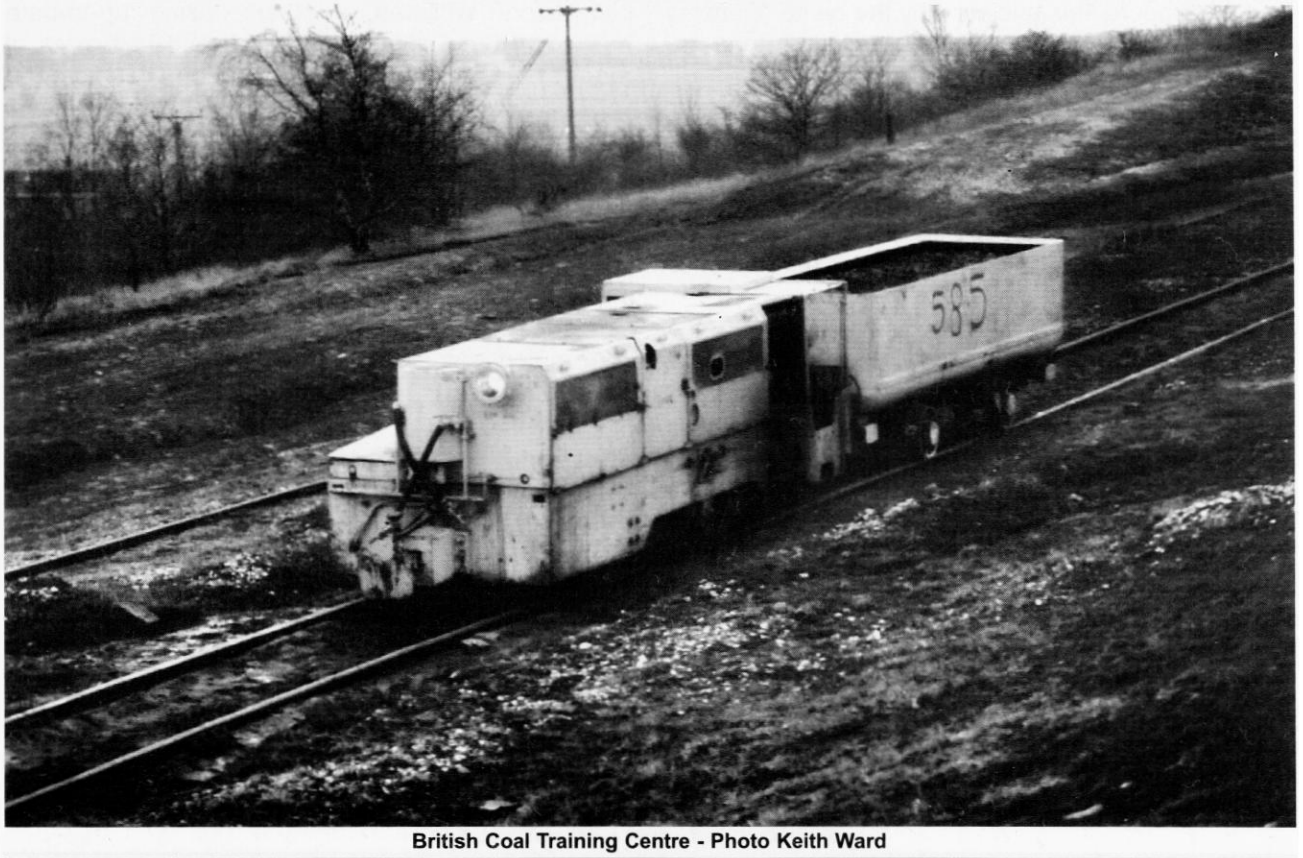
Prior to this new development Denby Grange's output had gone by road following closure of the famous inclined railway that linked it to the main rail network until the early 1960s. The combined scheme proceeded throughout the miners strike in 1984/5 and was completed in 1987.

Now all the output from the Barnsley area was moved by conveyor out of Woolley drift straight into the

Mines Miscellany - A Series of Mine Articles



British Coal Training Centre - Photo Keith Ward



British Coal Training Centre - Photo Keith Ward

Mines Miscellany - A Series of Mine Articles

Denby Grange Main Colliery 1980's Buildings - Photo Keith Ward

preparation plant and away by rail via two massive loading hoppers. It is unclear why the name of such a small pit as Denby Grange was used rather than say Barnsley Main?

Unbelievably after many millions of pounds had been spent on the venture closure was announced in 1991 and by 1993 all sites had been cleared. The Woolley hoppers were blown up attracting the national press and for a month or so lay like fallen dinosaurs on their side.

Betws Drift Mine

Begun in 1974 the NCB opened Betws drift mine in 1976 for the extraction of much sought after anthracite coal. The mine had three drifts which were driven 3,500 yards below Ammanford Colliery into the Red Vein seam.

One drift was used for man-riding; the other two for materials. .They were fitted with a trapped rail system which unusually could be seen on the surface. Only three mines in the UK had stockyard trapped rail systems. The coal output drift had a conveyor. The total cost was £11 million.

The construction work was undertaken by the contractors Williams of Neath; using up-to-date machinery they advanced the two and half miles of roadway with a gradient of 1 in 5 at an average of 50 yards per week. Over 400,000 tons of waste material was removed. During the late 1970's when in production, 424 men were producing 515,000 tons of Anthracite yearly.

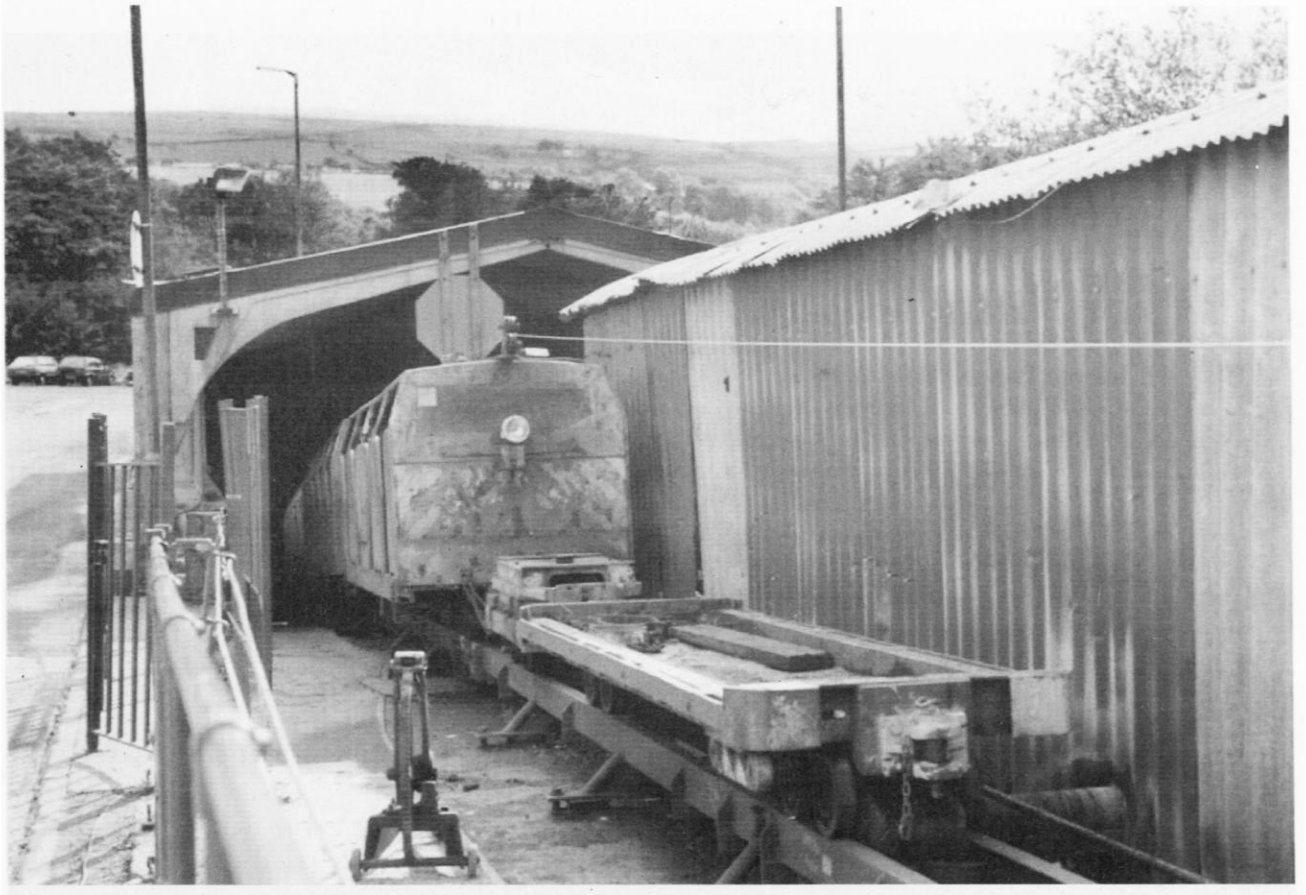
In 1983 a further £12 million pound investment was made to drive into other seams, which lay beyond the Gardener's fault and in the following two years another £3.9 million was spent on a new drift and ventilation shaft.

When visited in 1992 the NCB were preparing to close the mine despite its high productivity!

Fortunately a management buy out saved the mine which continued production under the name Red Dragon Coal for another ten years until it finally closed due to exhaustion of deposits in July 2003. Over the years, its coal was much in demand from preserved railways.

From Keith Ward

Mines Miscellany - A Series of Mine Articles



Betws Manriding Drift - Photo Keith Ward

Shibden Dale Mine 1991 - Photo Keith Ward

RAF Durrington - Fable or Fact - An Enquiry

Field Place House

Following Germany's change of tactics from daylight to night bombing subsequent to the Battle of Britain the 'Night Interception Committee's' meeting of 19 August 1940 proposed that a radar receiver in a mobile, miniature operations room that would provide efficient ground control to enable fighters equipped with Air Intercept (AI) radar, already in existence, and capable of cover over both sea and land. The Royal Aircraft Establishment (RAE) was instructed to design and to provide an example within one month with the title of ground Control Interception (GCI).

In urgent response, the scientific services threw everything they had at the problem resulting in a hurriedly cobbled together, mobile intercept unit based upon a War Office 'gunlaying' equipment designed at the Air Defence Research and Development Establishment (ADRDE) at Christchurch near Eastbourne, incorporating modifications by the Air Ministry's Telecommunications Research Establishment (TRE) at Worth Matravers, near Swanage.

The experimental model of this, the first GCI was ready by 10th October 1940 and was sited in the open fields of Field Place Estate at Durrington, on the northwest outskirts of Worthing, which had previously been requisitioned by the War Office. The estate had been prepared for redevelopment before the war and had roads and services, gas, water, electricity and sewage laid on.

The GCI unit consisted of two aerial trailers, one each for Transmitting (Tx) and one for Receiving (Rx), A truck held the actual transmitter whilst a second truck held the receiver and the operations room. Two trailer generators and two mobile vhf communications vehicles completed the technical equipment; all laid out in a long line on what is now Palentine Road.

The success of this installation: RAF Durrington GCI Station No 01G was swiftly followed by a prototype station at RAF Sopley (02G) and then four more production models. The title of these stations was Air Ministry Experimental Station Type 8 (AMES Type 8)

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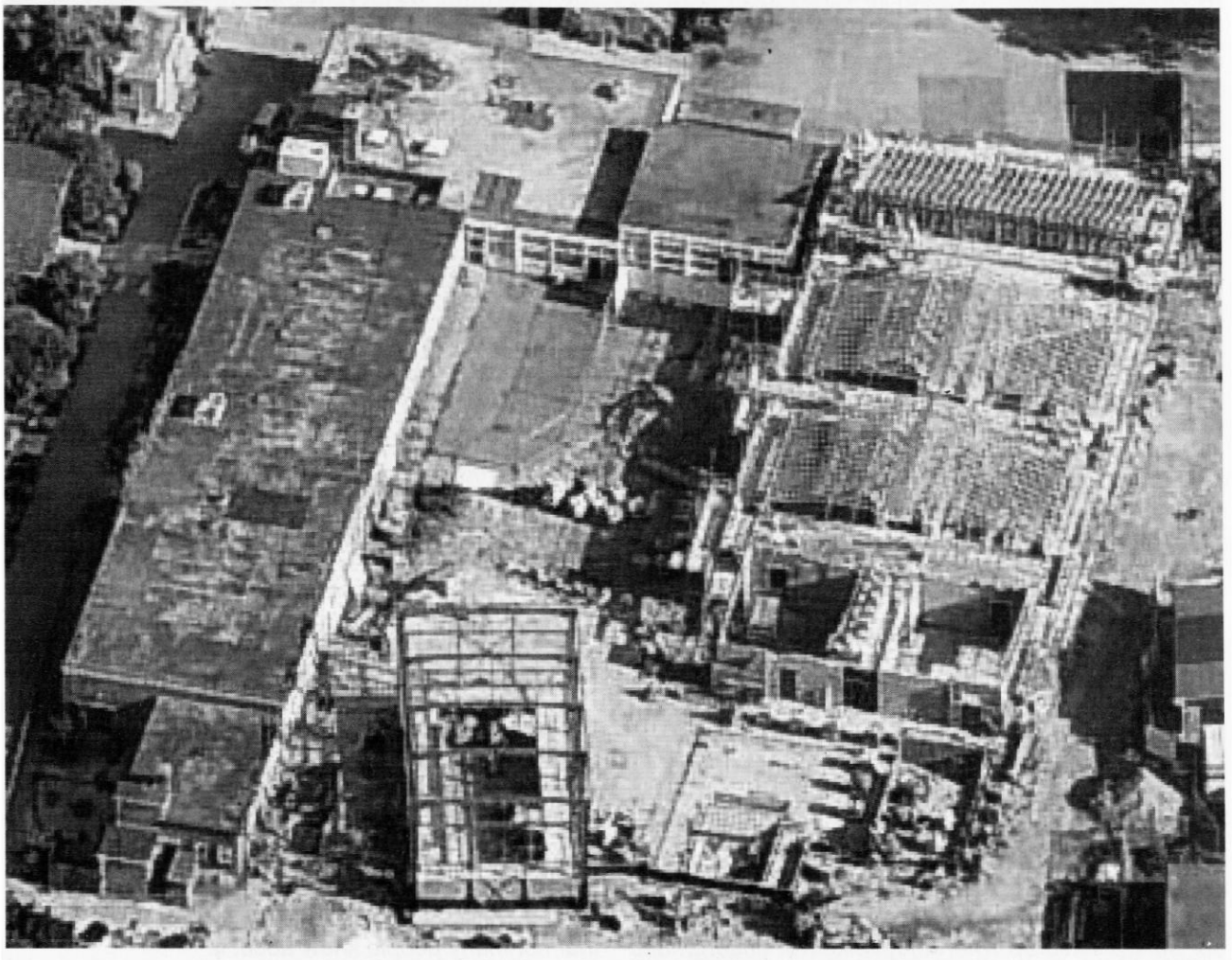

Happidrome at Palantine School. The happidrome is on the left.

Plans were drawn up for a permanent fixed installation capable of multi-interceptions called AMES Type 7 housed in a brick built operations room entitled a 'Happidrome'. A delay in the design and equipping of these resulted in a series of intermediate mobile and transportable stations being utilised. Durrington continued to be used as an experimental as well as an operational station with Sopley as the prototype site.

Having established the station the first requirement was for accommodation for personnel, The Air Ministry acquired from the War Office the use of Manor House Country Club (Field Place House) and its grounds laid out for sport, tennis courts and bowling greens etc. which was vacant and this became the HQ of the Domestic Site with offices and mess within the house, whilst huts were provided near the garages to the north of the house for other ranks. Four large detached houses in Bolsover Road (the only properties in the road) were included and were used as Officers Mess and WAAF's quarters. Two cottages and other outbuildings were utilised for stores and M/T. Extensive private wire telephone lines from the Private Branch Exchange (PBX) in the Happidrome were routed through Field Place House to the railway bridge at Durrington Station and thence to Worthing Trunk Telephone Exchange in Mulberry Lane three-quarters of a mile away

RAF Durrington continued as a successful GCI radar station until the end of the war when it was closed and the equipment removed. The Happidrome building at the technical site remained and later became a school, now greatly enlarged but still based upon the original structure.

By 1945 the owners of Field Place Estate including Field Place House and sports facilities, and the four houses in Bolsover Road, put it up for auction in 35 lots, pending derequisition by the War Office, although still occupied by the Air Ministry. The auction took place on 25th September 1945. The house and sporting facilities were purchased by what became the 'Flamingo Country Club. A detailed description of the lots, the buildings and facilities exist today. No mention of any underground features is included in this

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accurate description of the lot. In 1956 Field Place, the pre-war Manor House Country Club and post-war Flamingo Country Club, auctioned as one lot, was purchased by Worthing Council for a Sports and Leisure Centre, a situation that remains to this day. Improvements were made during 1956 and the house was refurbished in 1989.

Move forward twenty years to the mid 1960's and rumours start to appear regarding a secret underground headquarters at Field Place. Then at the beginning of January 1996 an article appears in the Worthing Herald consolidating these rumours with the result that on 19th January 1996 a major feature appeared in the paper as follows:

REVEALED: WORTHING'S NETWORK OF TUNNELS - Hidden but not forgotten: town's underground secrets

News Editor John Hammond uncovers how news is only now emerging of the full role played by the town's war-time base

History enthusiasts have been tracing the network of tunnels under Field Place, Worthing; a labyrinth that led to a secret base. Ken Harris, brother of Field Place amenity complex manager, Tony, said " When we first came here about 30 years ago, we used to have the radar reunion people here for their annual meetings. They always used to talk about the radar headquarters and the 'local seat of government' being here. Then our ears pricked up when they talked of underground tunnels.

Other people used to talk about how big the tunnels were; 'six miles of tunnels' and that just before D-Day they stored 500 Harley-Davidsons down there before going over to France."

Mr Harris said it turned out that a green-keeper at Field Place, Mr John Hammersley, had played in the tunnels as a boy in the 1950s.

"They were vastly more complicated than we thought," said Mr Harris, "They stretched from the eastern side of West Park, where the children's play area is, to Field Place. From there they went to the Durrington railway station area, The Strand, a military hospital set up at what is now the Inland revenue's Barrington Road site and to what used to be an above ground-ground radar base, where Palantine School is today."

The council blocked off the concrete tunnels to prevent vandalism but "The man who did it has now retired and gone to that council in the sky."

Efforts to trace the labyrinth have included consulting a well-known dowser from London, who said there was so much under the putting green and bowling areas he could not get a clear reading.

Further research at the Government's war records office was also useful. A sketch of the radar room is shown here. However, even now the whereabouts of the main entrances is covered by a 73 year secrecy rule.

Mr Harris said Worthing Borough Council had been very good and allowed exploratory digs to take place, but some rooms were about 19 ft under the surface.

"We know where everything is; really it's now just trying to find someone who could tell us where there might have inspection shafts, which would only be two or three feet under the surface, or air vents."

The main command centre, under the putting area at Field Place, was about 23ft wide by 40ft long. Digs had exposed a war-time well, an emergency water storage tank, the main transport entrance and pillars, believed to have been part of a covered entrance way.

"I think the people of Worthing really don't realise how big a part the town played in the war; when you think we were the very first radar station of this sort in the country and everything was copied from this. I think Worthing people should be proud the town played such a part in the war. Unfortunately, it was so secret that not many people knew about it.

Soldiers and sentries at the base were allowed only where their duties took them and the only people who knew what everyone else was doing here were the bases operators"

Mr Hammersley, who played in the tunnels when he was about 12, said there was a route into the tunnels through rooms in Field Place's manor house. He had also seen evidence of the RAF's concrete tunnels linking with old, brick-built ones, believed to have been used in the days of smuggling.

'We decided to explore'

The Herald's recent front-page story revealing there was a labyrinth of secret, underground tunnels under Field Place, Worthing, brought back childhood memories for Hugh Bartlett.

History enthusiasts told how tunnels led to a war-time radar headquarters, plus the local base for government in the event of an invasion or other disaster. But after the war and when Mr Bartlett was about six years old,

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Worthing Leisure Centre - Field Place House is bottom left

he knew the tunnels as a "secret play area. I know there's a huge network underneath there."

Mr Bartlett, now 51 and living in Littlehampton, added, "We hadn't been told there were tunnels underneath there, but, kids being what they are, we decided to explore."

Mr Bartlett used to live in one of the four houses which stood in Bolsover Road after the war; the rest of the area was surrounded by fields. "Before it was 'Field Place,' it was a country club called the Flamingo and there was a family called the Posfords who owned it. They had two boys and my brother and I were very friendly with them. The lads used to get into the labyrinth through what may have been a ventilation shaft in front of Field Place."

He said this was like a little coal bunker raised above the ground with a small steel door on it. "We went down onto a staircase and into the tunnel. There are lots of little annexes down there; it was something like the underground hospital in Jersey - like a honeycomb, with lots of bits and pieces."

Mr Bartlett said as a child some of the areas seemed "really spooky," so they never went in them, but he did recall a large room. "The thing I remember very distinctly was the great big, thick steel tables. Also in the network were old-fashioned fire extinguishers hanging on the walls, old bicycles in one of the annex rooms and large light fittings in the tunnels."

Mr Bartlett's mother, Jean, who still lives in Bolsover Road, said she had had no idea her son was exploring the tunnels. Four generations of Mrs Bartlett's family have lived in Worthing, but she recalls the public were not allowed into the area around Field place during the war.

Where to start? Let's look at the secrecy claim. "Field Place records are closed for 73 years" This is a misread of the Public Records (now National Archives) closure rules, which are in multiples of 25 years, i.e. 25, 50, 75 and 100 years from the date the file closed. All records held at the National Archives are catalogued, noting the current status of the file, ie, Open, Closed (with the period of closure shown) or retained by Department of Origin. If a record is not listed in the catalogue, it does not exist in the Archive and if it does not exist it cannot be closed for 75 years.

An inspection of the records held by Worthing Council at Field Place was made. Prominent among them are

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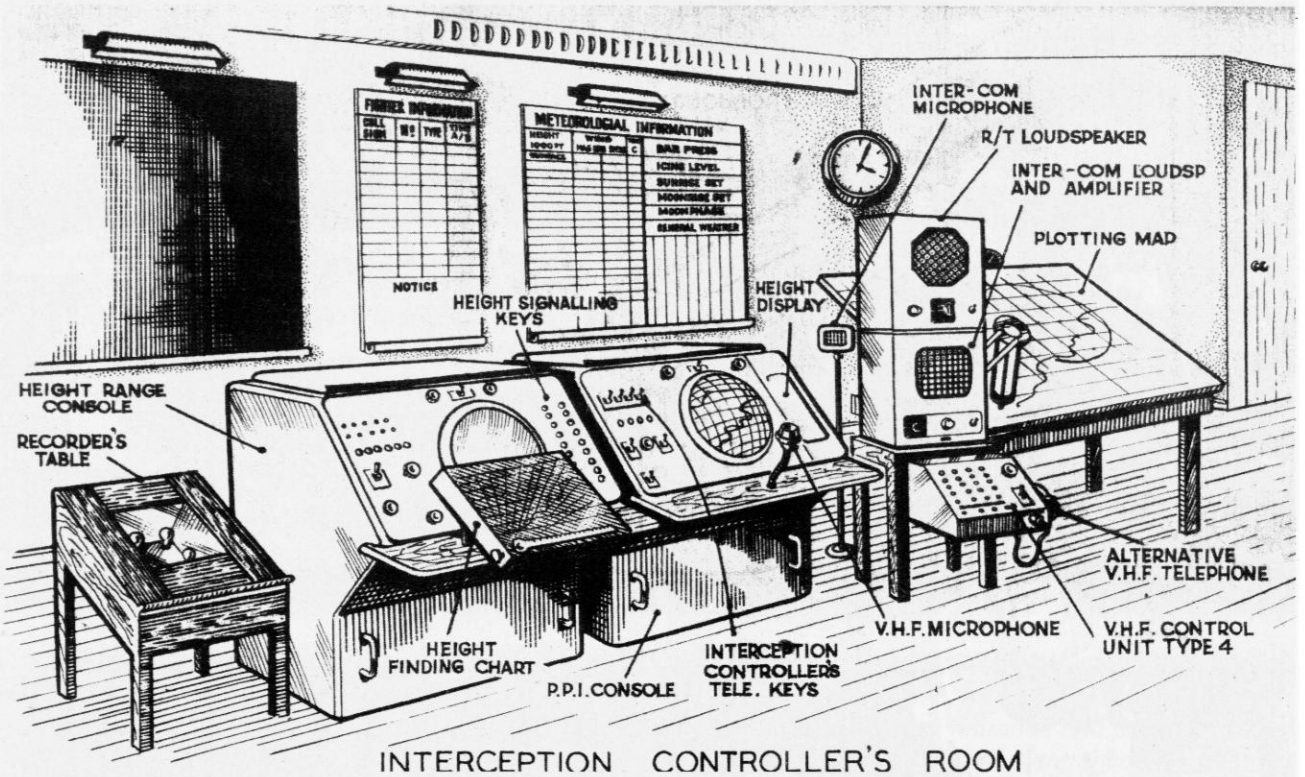

INTERCEPTION CONTROLLER'S ROOM

dozens of letters to every possible department of Government, local and national as well as record offices and libraries. However all the letters were the same, only the addressees differed and all the responses were in the same tenor, We have no record, We have no knowledge. This was because the question asked for records of "Field Place" and no such entity existed. As far as the RAF, the wartime occupier of Field Place was concerned, the question should have been " What records exist with regard to RAF Durrington?" as Field Place was only a component of it, namely the domestic site.
A search at National Archives for Field Place came back 'No result'

A further claim is that a reply from the Ministry of Defence stating 'Field Place has no wartime tunnels or an underground command centre' is alleged to have contradicted itself by saying that 'if blocked off entrances are uncovered, under no circumstances should they be tampered with as it would certainly lead to serious implications' This caveat sounds like a sensible caution to add to any enquiry regarding wartime underground structures and would not necessarily be directed at Field Place. Of significance is the fact that this letter is missing from the file.

A search of the National Archives at Kew came back with 9 files relating to RAF Durrington exclusively and numerous other files where Durrington was mentioned in relation to a technical matter, i.e. radars, experiment, etc. The station Operations Record Book (ORB), a diary which records daily events operational, technical, personnel, domestic and welfare has not been retained, a normal situation where only the most important percentage of a stations records are kept, in this case the technical records of the first GCI station.

The only underground feature of a Type 7 Final Radar installation is the R7 well, an underground chamber containing the actual transmitter itself, located directly below the aerial, in this case, just to the south of the Happidrome, south of Palantine Road.

Conclusion: There is no secret cover up.

The reference to the sketch of the "Radar Room" found in the 'Governments War Records' is in fact an illustration from the Air Force handbook for Final GCI Stations (AP 2901F Final GCI Stations. AMES Type 7) and is of the Blue Intercept Cabin in the Happidrome at what is now Palentine School and not of any underground bunker.

Conclusion: This has no relevance whatsoever.

The main thrust of the story is that of an Underground Radar Headquarters and Local Seat of Government. This, according to a plan in the Field Place records, purports to be over 140 yards long and 40 yards wide. It is supposed to be of three levels with the top some 19 feet below the surface, so we're looking at an

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underground 3 storey building constructed of concrete in a 5 storey excavation. The entrance to this bunker is via the basement of Field Place with up to six miles of tunnels and a 23 feet by 40 feet Command Room. An immense undertaking.

The only two methods of constructing such a building are cut and cover or tunnelling. The former would involve digging an immense pit with sloping sides, constructing huge 5 storey building and then covering the result with earth, all without any apparent emergency exits, air handling plant or intakes or indeed any noticeable surface features, and all this without anyone noticing. A major problem with this version is that the site was, pre war, laid out as a sports ground with bowling and putting greens and multiple tennis courts, with across the centre of the site a 17th century flint barn (a listed building) and a pavilion. These features were present pre war, during the war, post war and still exist today.

The second method, tunnelling, which would have to have been dug by an Army, Royal Engineers. Tunnelling Company. consisted of laying corrugated iron sheets over steel mining hoops, examples of which cover southern England. The tunnelling company responsible for this particular area was 172nd Tunnelling Company, Royal Engineers whose records exist at the National Archives. These show, in detail, a list of all their work, Section by Section, from the beginning of the war until their redeployment to Gibraltar in 1942.

There is no record of any such work at Durrington or Field Place.

A major question at this stage is for whom was this massive bunker built? Not the RAF, who had a strongly built, purpose designed radar station just a couple of hundred yards away, this being the very reason for RAF presence in the first place. The Army wouldn't need it with the RAF in possession of the site nor would the Government, whose graduated dispersal schemes from London are well documented and recorded. An evacuation from London due to an imminent overrun by an enemy would not normally involve a retreat through enemy lines to an area where the invasion had taken place and was occupied by that enemy. The threat of invasion was not fully lifted until the German invasion of Russia in June 1941. The Navy was adequately catered for elsewhere.

Mr Harris, a principal in this story, claimed that the council had given permission for an exploratory dig and that an emergency water tank, a wartime well and the main transport entrance had been uncovered and that they knew where everything was. This is disputed by the council, who state that no permission had ever been applied for, and that even if it had been, the request would have been turned down. Any activity on the site, if indeed any took place at all, would have been un-authorised. Despite this claim, no report, plan, drawing or photograph has been forthcoming and no trace of the alleged artefacts has ever been found.

An examination and a photographic record was made of the basement of Field Place which reveals a double vaulted brick built cellar which had originally contained a wine cellar, a fruit and vegetable store in one vault with a coal cellar in the other. This latter now contains a modern gas-fired central heating boiler. A narrow, now blocked off, staircase led to the then, ground floor kitchen, outside the door of which, an outside stair led back down to the cellar. The 18th century brickwork is intact on all walls with no signs of breaching or blocking up. Some bricks have been removed to facilitate the entry of modern services, such as gas and electricity.

The next claim is of 500 American Harley Davidson motorcycles being dumped in the bunker prior to D-Day. These are American machines and were not under normal circumstances used by the RAF or British Army. If, in the unlikely event of a US unit not requiring them post D-Day (one questions why they had them at all) then any one of the hundreds of vast US stores and depots across the south and west of the country would have had ample space for these machines and still retained control of them.

This part of the story is utterly ludicrous.

The claim that the concrete bunker tunnels link with old brick smuggler tunnels has been investigated and dismissed by others.

Conclusion: There is no primary evidence of any kind to support any of the claims made and which are re-butted above. None of the principal players are either alive or traceable, despite recent press appeals. The remainder is either hearsay or gossip. If any one part of the story falls, so must the rest, which is dependent upon that part.

My contention is that the entire story and its claims are a myth, with the caveat, that only when the site is finally dug up will the truth be fully revealed.

A tentative offer, to the councils Leisure Department, on the behalf of Sub Brit, was made; to investigate the alleged bunker by means of excavation was met with the kind, but firm response "Not in a thousand years"

To the reader, Fable or Fact, the choice is your.

Bob Jenner. July 2007

Kent Archaeological Society

KENT ARCHAEOLOGICAL SOCIETY CELEBRATES 150th ANNIVERSARY WITH A LONG RECORD OF UNDERGROUND RESEARCH

The Kent Archaeological Society was established by 11 persons (of whom four were titled, three were clergy, two were MPs and the other two mere Esquires) at Mereworth Castle on 19th September 1857. By 24th November the same year there were 367 members, and the first volume of its journal Archaeologia Cantiana was published in 1858.

The subterranean archaeology of Kent was noticed in that first volume, in a paper by Robert Booth Latter on archaeological deposits found in a 'chalk cavern' at Camden Park, near Chislehurst (now in the London Borough of Bromley.)

The archaeological finds appear to have fallen or been washed into a 'swallow-hole' caused by natural solution of the chalk by rainwater. The bottom of this was found as a result of chalk miners driving a heading or horizontal adit. The author remarks that 'Under Camden Park, it is reported among the chalk-workers, that waggons and horses have been led underground ..' but that 'The openings, however, are now closed up with sloping banks of sand' (which would have been the overlying Thanet Sand.)

By May 1857, however, mining had evidently been recommenced, as our informant tells us that 'a labourer was employed in Camden Park pit, in cutting chambers in the chalk at right-angles, and removing chalk for lime-burning; suddenly his pickaxe entered a mass of dark, soft, pulpy, sandy earth. On widening the aperture the mass of dark earth appeared in considerable quantity, and the skull of a large dog or wolf, with several delicate land shells, rolled with the mass at his feet.' Further investigation of the contents of the earth in the solution hole, the bottom of which had been thus unintentionally intercepted, revealed 'remnants of early rude British or Romano-British pottery', more animal bones and teeth and a 'small vessel of red Samian ware.'

A hundred and fifty years later, the archaeology of the then active (but poorly documented) Camden Park chalk mine is of, arguably, as much interest as the contents of the solution hole.

The now-closed Camden Park chalk mines are on the opposite side of Old Hill from the better-known Chislehurst 'Caves' now operated as a public visitor attraction. Rod Le Gear, now a part-time guide at Chislehurst Caves, is also currently researching their archaeology and history, including their use for World War I military storage (explosives), mushroom-farming, and World War II public air-raid shelters.

An interest in the underground archaeology of Kent is being maintained, in the Kent Archaeological Society's 150th year, by Subterranea Britannica member Rod Le Gear, who joined the KAS in 1963, and has had published, in Archaeologia Cantiana and elsewhere, numerous research reports on chalk mines, deneholes, and underground ragstone quarries in the county. A very useful review of what little is known of the Camden Park mines has been published by him in Kent Archaeological Review 167, 146 - 152 (2007), noticed elsewhere in this issue of Subterranea.

Rod, a retired engineer, is a member of the Association of Archaeological Illustrators and Surveyors, and an Associate of the Institute of Field Archaeologists. In 1981 he founded the Kent Underground Research Group to promote the study of such sites. He has served on the Kent Archaeological Society Council since 1983 and is a member of the Fieldwork Committee of the Kent Archaeological Society.

A paper in the 150th anniversary volume of Archaeologia Cantiana, reviewing the last 50 years' work in Kentish archaeology notes that 'From time to time the Society has fostered and supported particular interest Groups .. Two such in the 1990s were the Kent Underground Research Group (KURG) and the Kent Defence Research Group (KDRG), both of which went on to become highly successful independent organisations, affiliated to the KAS.'

Rod's two latest research reports in Archaeologia Cantiana are noticed elsewhere in this issue.

SOURCE: Archaeologia Cantiana 127 (2007), pages 12 and 465.

SOURCE: Rodney F. Le GEAR, 2007, Underground ragstone quarries in Kent: a brief overview. Archaeologia Cantiana 127, 407 - 419.

SOURCE: Rodney F. Le GEAR, 2007, An early gallery at Chislehurst Caves. Archaeologia Cantiana 127, page 435.

SOURCE: Robert Booth LATTER, 1858, Discovery of fragments of ancient British, Romano-British, and Roman pottery found in a chalk cavern in Camden Park, Chislehurst, near Bromley, Kent. Archaeologia Cantiana 1, 137 - 142.

From Paul Sowan

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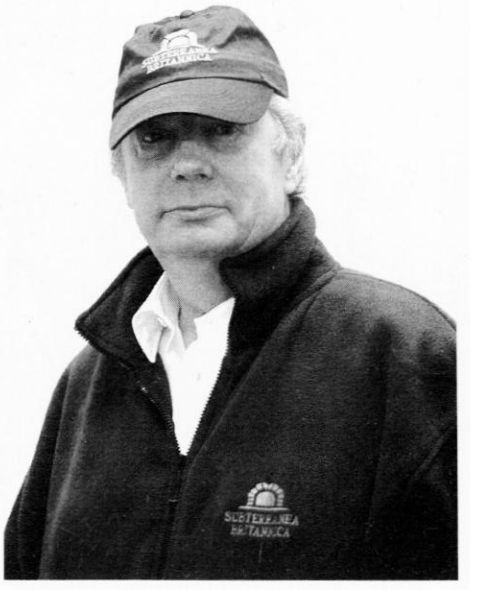

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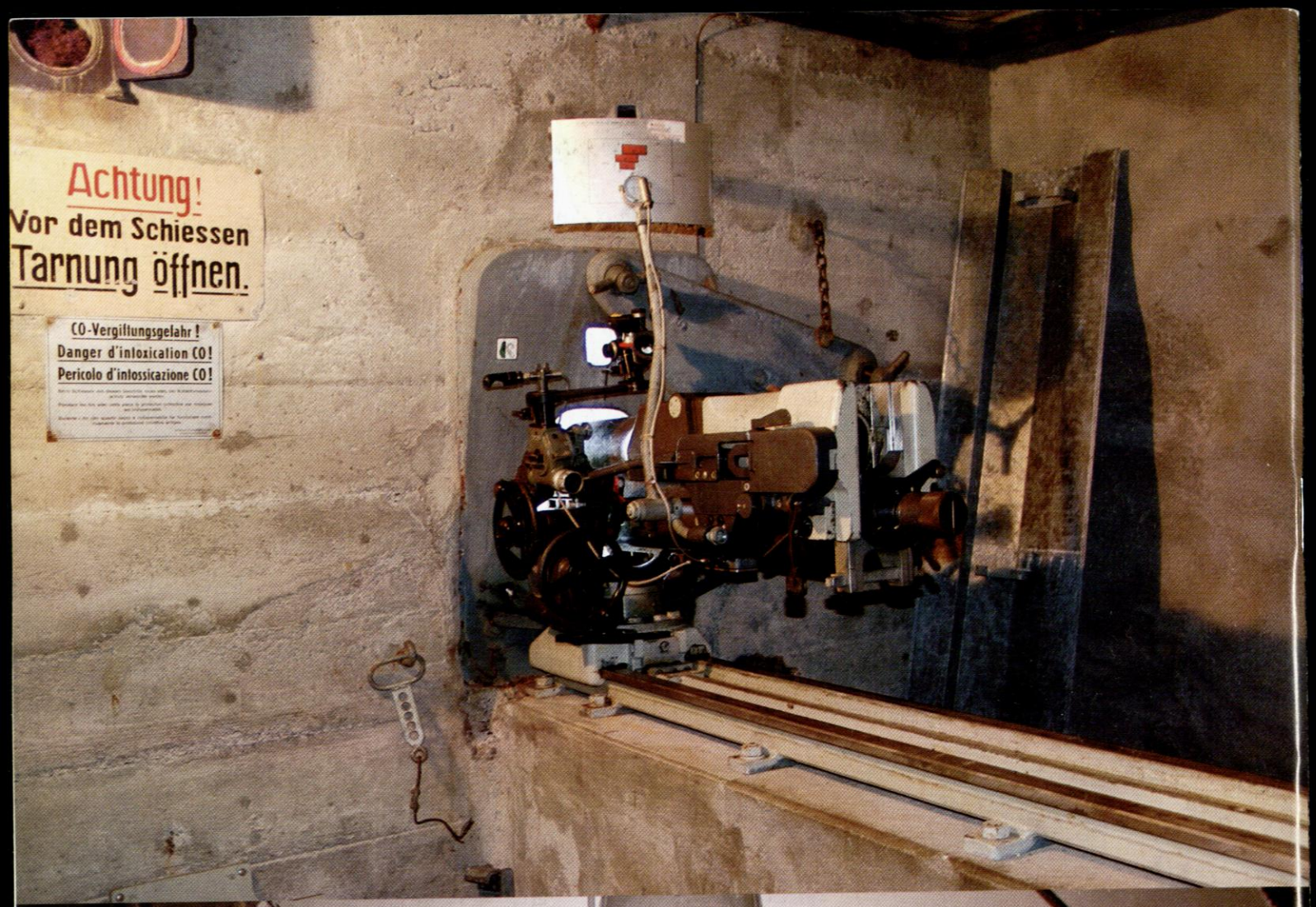
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